



**Yakama Nation**

**Upper Columbia Habitat Restoration Project**

**ANNUAL REPORT**

*Report covers work performed under BPA Project #2009-003-00  
Master Agreement #56662 - Releases 111, 142, 161, and 169*

*Report was completed under BPA Project #2009-003-00  
Master Agreement #56662 - Release 161*

REPORT COVERS WORK FROM JANUARY 1<sup>ST</sup>, 2018 THROUGH DECEMBER 31<sup>ST</sup>, 2018

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## **Attachment 1 – Constructed Projects As-Builts**



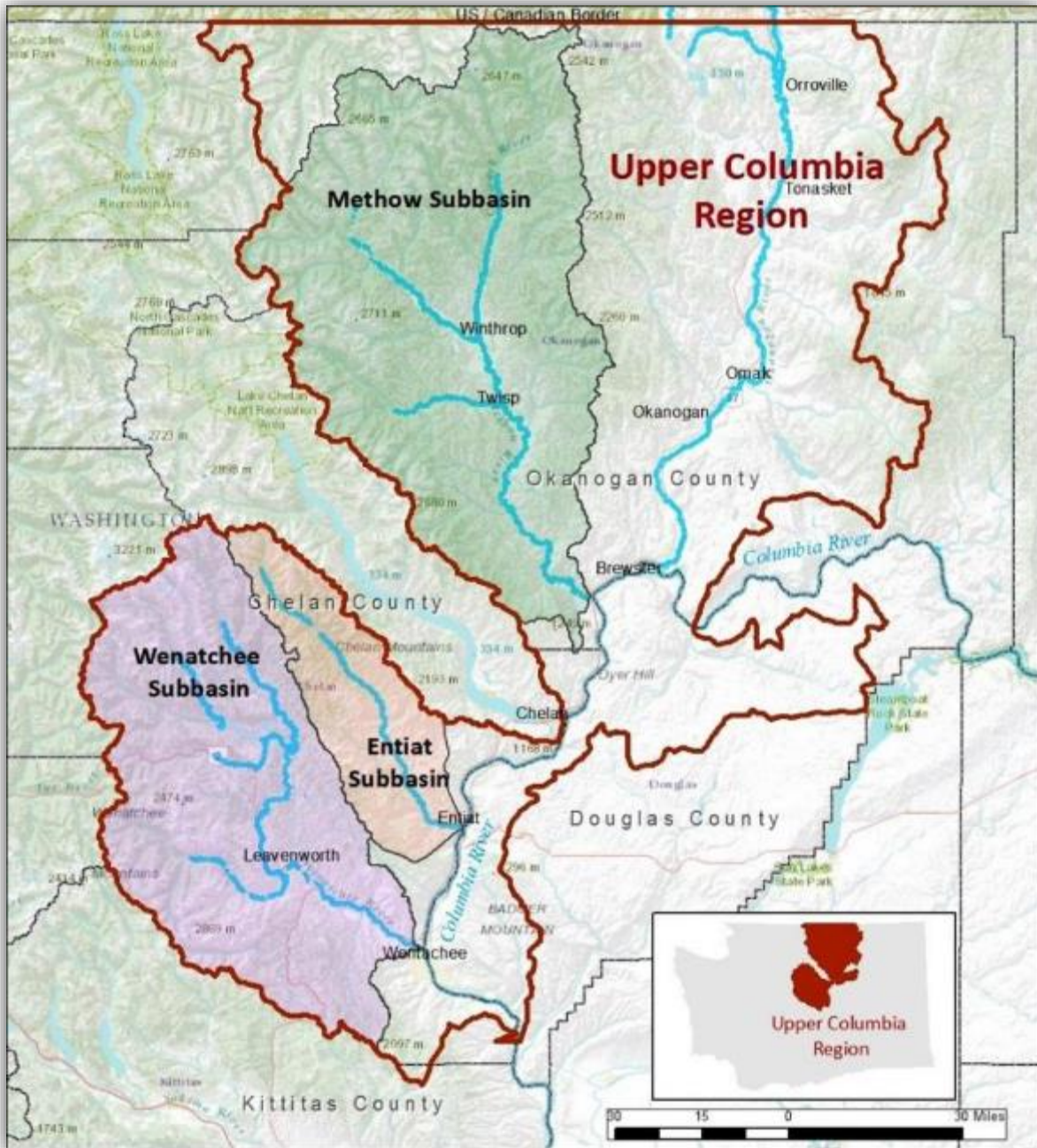
## **Project Overview**

Using funding from the 2008 Columbia Basin Fish Accords, the Yakama Nation Fisheries' Upper Columbia Habitat Project (YN UCHRP) plans and implements habitat related salmon and steelhead recovery actions in the Wenatchee, Entiat, and Methow Subbasins as guided by the Federal Columbia River Power System (FCRPS) biological opinion. This report summarizes the work performed by the YN UCHRP under BPA Project #2009-003-00-Master Agreement #56662 in calendar year 2018. This one year time period spanned multiple Scopes of Work and Budget Releases under Master Agreement 56662, including portions of Releases 111, 142, 161, and 169.

During this reporting period, the YN UCHRP built upon previous project development momentum to move forward reach assessments in priority tributaries, conservation acquisitions, and restoration designs for future projects, and to complete multiple large scale habitat restoration projects which contribute directly to FCRPS biological opinion targets. Restoration actions completed during the reporting period include:

- **Peshastin RM 2.7 Project (Wenatchee Subbasin)**
- **Twisp River Horseshoe Side Channel Phase 1 Project (Methow Subbasin)**
- **Chewuch River Mile 15.5 to 17 (Methow Subbasin)**
- **Tillicum Fan Project (Entiat Subbasin)**
- **Beaver Creek RM 2.6 (DOT) Project (Methow Subbasin)**

# Upper Columbia Basin Map



## **Restoration Objectives/Strategies/Priorities**

Salmon habitat restoration objectives, strategies, and priorities in the Upper Columbia Basin are guided by the 2007 Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (Recovery Plan) and the frequently updated Regional Technical Team Biological Strategy (Biological Strategy), which is Appendix C of the Recovery Plan. The Recovery Plan and Biological Strategy identify specific priority areas and impaired ecological conditions by which targeted restoration actions are expected to help increase population metrics for endangered fish stocks. Within priority areas identified by the Biological Strategy, the YN UCHRP performs habitat and geomorphic reach assessments to better understand existing conditions and ecological concerns for the development of restoration actions. From these reach assessments we identify specific project actions that could be implemented to reduce ecological impairments. The reach assessments are reviewed by the Regional Technical Team and the new information is used to update to Biological Strategy as necessary.

Priority restoration actions identified in the reach assessments are developed by YN UCHRP staff into on the ground restoration projects through coordination and partnerships with underlying landowners, permitting/regulatory/land management agencies, local governments, and other restoration project sponsors. Most project coordination is facilitated through the Watershed Action Teams. The YN UCHRP uses engineering and design firm subcontractors to develop detailed habitat restoration plans. Prior to implementation, final project designs are agreed to by participating and/or affected landowners and are used to acquire necessary permits and federal consultation permissions.

As deemed necessary to ensure prioritized restoration work can proceed, the YN UCHRP acquires land or right of entry agreements using both 2008 Columbia Basin Fish Accord funds and other grant monies available for targeted acquisitions. YN UCHRP acquisition projects are prioritized based on the identified need and existing prioritization scheme used to determine the schedule of habitat restoration work.

At the time of completing an individual reach assessment, we utilize a project prioritization scheme on all identified restoration actions within the reach assessment area to determine where to prioritize our restoration work, and which types of actions to pursue to get the highest biological benefit. Reach assessment project ranking methods generally follow the following guidelines:

## Reach Assessment Project Prioritization Guidelines

For each project site identified through a reach assessment process, assign the following scores in a table:

**Step 1: Benefit Score** Projects are scored according to 4 benefit categories, which include a “recovery gap” category and 3 additional categories. Scores for each category are summed to obtain the *Benefit Score*.

**Step 2: Cost Score** Projects are given a *Cost Score*, which reflects the overall *relative cost* for the project based on techniques, access, and construction feasibility issues.

**Step 3: Benefit-to-Cost Score** Total benefit score (sum of all 4 benefit scores) is divided by the cost score to obtain the *Benefit-to-Cost Score*.

**Step 4: Feasibility Designation** Projects are given a *Feasibility Designation* based on the overall likely feasibility of being able to implement the project within a 10-year timeframe.

### 1. *Benefit Score*

The Benefit Score includes the summation of scores from 4 categories. These include the Recovery Gap score (0-6 points), the Fish Use score (1-3 points), the Root Causes score (1-3 points), and the Ecological Concerns Score (1-4). The guidelines for scoring are provided below.

#### **Recovery Gap**

##### Existing Condition Rating (1-7)

- 1 – Very low ecosystem function and habitat quality. Highly altered systems.
- 2 – Low ecosystem function and habitat quality.
- 3 – Low-to-moderate ecosystem function and habitat quality.
- 4 – Moderate ecosystem function and habitat quality.
- 5 – Moderate-to-high ecosystem function and habitat quality.
- 6 – High ecosystem function and habitat quality.
- 7 – Very high level of natural ecosystem function and habitat quality. Pristine, unaltered systems.

##### Achievable Condition Rating (1-7)

These ratings use the same categories as above but reflect the future potential recovery trajectory. This is a rating of what can realistically be achieved given past and on-going impacts and constraints of land use, infrastructure, social acceptance, and ownership. Ratings should reflect an “optimistic potential scenario” in order to not discount large potential changes.

##### Final Gap Score (0-6)

This is simply the achievable condition rating minus the existing condition rating. This represents the gap that can be filled between existing and target conditions through restoration measures.

### **Fish Use**

- 3 – High existing or potential productivity area for spawning or rearing for multiple species
- 2 – Moderate existing or potential productivity area for one or more species
- 1 – Low existing or potential productivity area for one or two species

### **Root Causes**

- 3 – Restoration of root causes and key physical processes that create and maintain habitat over time
- 2 – Partial restoration of root causes
- 1 – Primarily a structurally-focused restoration strategy that doesn't significantly address underlying causes

### **Ecological Concerns Score**

- 4 – Addresses multiple high priority ecological concerns
- 3 – Addresses one high priority ecological concern
- 2 – Addresses one or more moderate priority ecological concerns
- 1 – Addresses only low priority ecological concerns

## **2. Cost Score**

The cost score reflects the relative cost for the project based on techniques, access, and feasibility issues. This is a relative cost, not an absolute cost, so the scale of the project is NOT factored into this score. The cost score ranges from 1 to 3, with 1 reflecting relatively lower cost projects. The following guidelines/examples can help to determine the cost score.

### 3 – High relative cost

- Uses high cost techniques (e.g. constructed banks, highly engineered log jams, extensive channel shaping, extensive infiltration galleries)
- Deep excavation or long distance hauling of spoils
- Entails construction of additional new flood control or bank erosion features (e.g. setback levees or buried rip-rap)
- Extensive planting or invasive weed control
- Limited, difficult, or remote access
- Intensive de-watering requirements

### 2 – Moderate relative cost

- Uses moderate cost techniques (e.g. typical log jam structures)
- Moderate excavation and hauling distance of spoils
- Typical planting or invasive weed control
- Moderate access conditions
- Standard or no de-watering requirements

### 1 – Low relative cost

- Uses low cost techniques (e.g. non-ballasted log placements)
- Minimal excavation and hauling distance of spoils



- Little to no planting or weed control
- Easy access conditions
- No de-watering required
- Availability of free materials or volunteer labor

### 3. *Benefit-to-Cost Score*

The benefit-to-cost score is simply the benefit score divided by the cost score. This is a relative value used to compare project benefits.

### 4. *Feasibility Designation*

The feasibility designation is the overall likely feasibility of being able to implement the project within a 10-year timeframe. This is based on landownership, as well as economic, regulatory, political, social, permitting, or other considerations that are known to impact the feasibility of conducting projects within a reasonable timeframe. The feasibility designation is not used as part of the project scoring because feasibility issues may change over time and it is desirable to evaluate project benefits independent of feasibility. The designations include the following:

#### High feasibility

- No known feasibility issues.
- One or two landowners; or landowner(s) has already indicated willingness

#### Moderate feasibility

- There are potential feasibility constraints that could affect the likelihood of project implementation within a 10-year timeframe
- Three to five landowners; or there is reason to believe landowner(s) would grant permission

#### Unlikely feasibility

- There are known feasibility constraints that would be expected to limit the ability to implement the project within a 10-year timeframe
- More than five landowners: or there is reason to believe landowner(s) would not grant permission

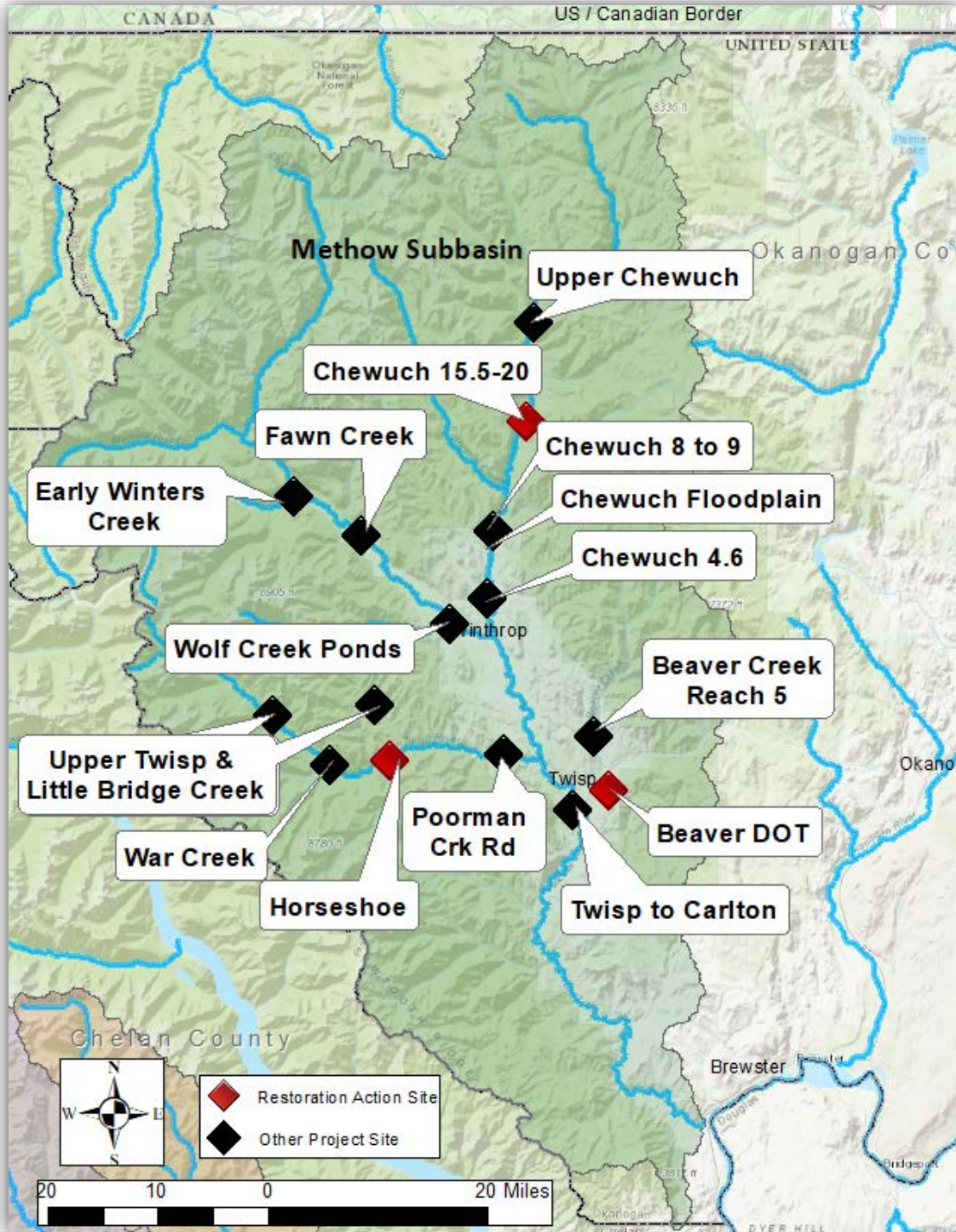
### *Sample Ranking Table*

Project Information					Benefit Score						Cost Score	Cost Benefit	Feasibility Designation	
Project Name	Sub Reach	Downstream HM	Upstream HM	Total Length (mi)	Restoration Gap Analysis			Existing and Potential Fish Use	Soil Causes	Ecological Concerns	Total Benefit Score	Score (1-3)	Benefit to Cost Score	Feasibility Designation
					Existing Condition (1-7)	Achievable Target (1-7)	Final Gap Score Target - Existing (0-6)	Score (1-1)	Score (1-1)	Score (1-1)				
Project 1	1	0	1	1	2	6	4	2	2	4	12	2	6	Moderate
Project 2	2	1	2	1	4	5	1	2	1	2	8	1	8	High

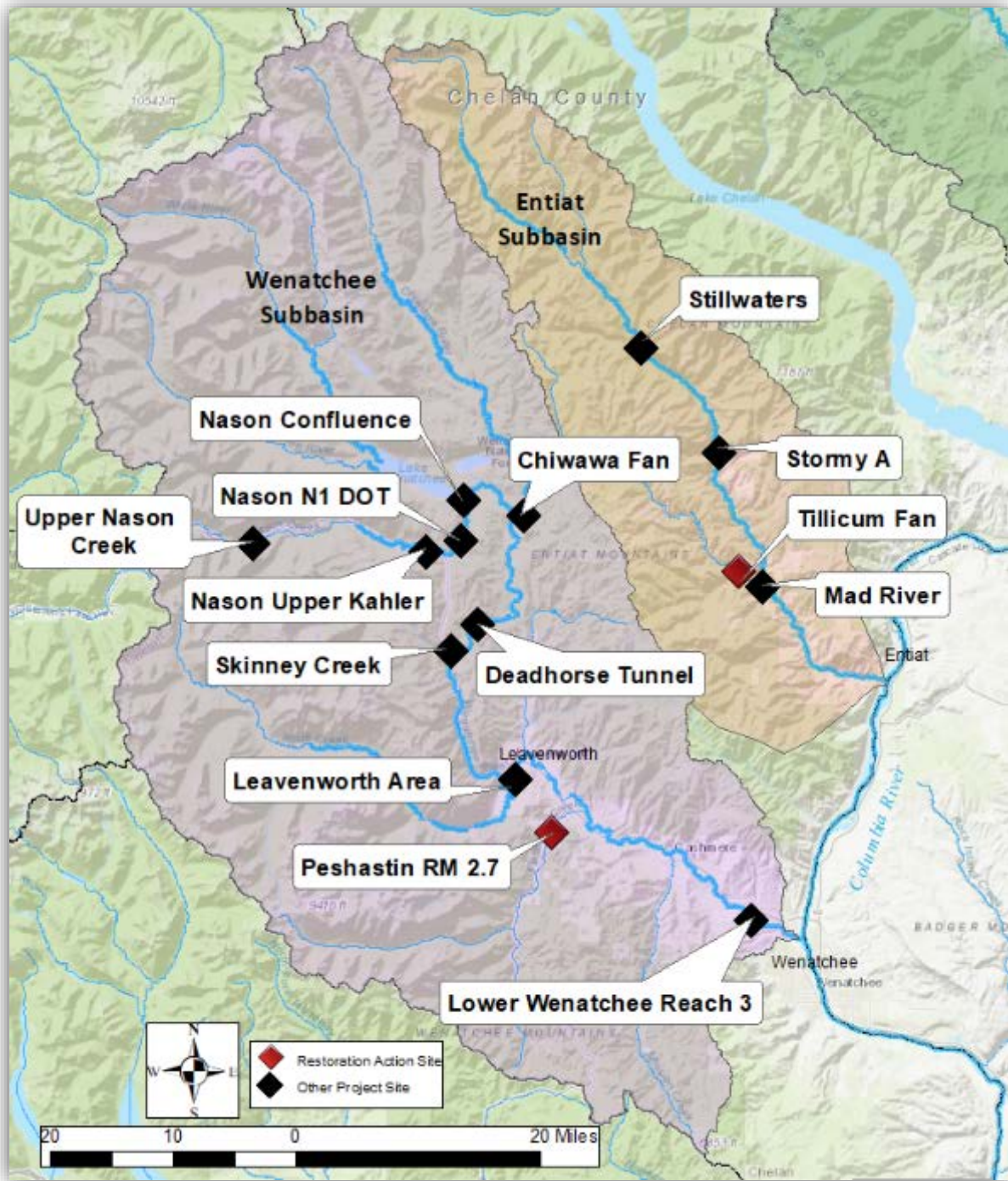
# Project Details by Subbasin

*(Maps and Tables)*

## Methow Subbasin Project Location Map



# Entiat and Wenatchee Subbasins Project Location Map



## Methow Subbasin Summary Table

Reach	Generic Project Name	Pisces WE Title	Contract	WE	WE Type	Status
Beaver Creek	Beaver Creek RM 2.6 (DOT) Project	Beaver Creek DOT Design 2017-194	REL 142	AC	Design/Engineering	Completed - 2018
		Beaver Creek DOT Design Replacement 2017-194	REL 142	AV	Design/Engineering	Completed - 2018
		Beaver Creek DOT Construction Management 2017-194	REL 142	AW	Design/Engineering	Completed - 2018
		Beaver Creek DOT Construction 2017-194	REL 142	AX	Restoration/Construction	Completed - 2018
	Beaver Creek Reach 5 Project	Beaver Creek Reach 5 - Design 2017-171	REL 142	AA	Design/Engineering	Extended to CY19
		Beaver Creek Reach 5 - Design 2017-171	REL 169	Q	Design/Engineering	On-Going
	Beaver Creek Fan Project	Beaver Creek Fan Design 2017-193	REL 142	AB	Design/Engineering	Postponed Indefinitely - 2018
	Lower Chewuch	8 Mile Creek Barrier Project	Eight Mile Barrier Removal Design 2015-141	REL 169	P	Design/Engineering
Chewuch RM 15.5 to 20 Project		Chewuch RM 17 to 20 Construction Oversight 2015-140	REL 142	X	Design/Engineering	Completed - 2018
		Chewuch RM 17 to 20 Construction 2015-140	REL 142	Y	Restoration/Construction	Completed - 2018
Chewuch 4.6 Project		Chewuch RM 4.6 Design 2017-176	REL 142	V	Design/Engineering	Extended to CY19
			REL 169	N	Design/Engineering	On-Going
Chewuch 8 to 9 Project		Chewuch RM 8 to 9 Design 2017-177	REL 142	W	Design/Engineering	Completed - 2018
Chewuch Floodplain Project	Chewuch Floodplain Ranch Design 2019-202	REL 169	O	Design/Engineering	On-Going	
Upper Chewuch	YN Reach Assessment	Upper Chewuch Habitat Assessment 2017-180	REL 142	Z	Assessment	Completed - 2018

Reach	Generic Project Name	Pisces WE Title	Contract	WE	WE Type	Status
Lower Twisp	Twisp Horseshoe Side Channel Project	Twisp Horseshoe Phase 1 Culvert Construction Oversight 2010-39	REL 142	AL	Design/Engineering	Completed - 2018
		Twisp Horseshoe Phase 1 Culvert Construction 2010-39	REL 142	AM	Restoration/Construction	Completed - 2018
		Twisp Horseshoe Phase 2 (USFS) Restoration Engineering 2010-39	REL 142	AK	Design/Engineering	Extended to CY19
			REL 169	V	Design/Engineering	On-Going
	Horseshoe Acquisition 1 - Twisp River 2018-201	REL 161	AH	Acquisition	Postponed Indefinitely - 2018	
	Twisp Poorman Creek Road Project	Poorman Creek Road Side Channel Project - Design 2012-100	REL 142	AF	Design/Engineering	Completed - 2018
	Little Bridge Creek Projects	Little Bridge Creek Design (USFS Projects) 2017-182	REL 142	AJ	Design/Engineering	Extended to CY19
	Newby Narrows Project	Newby Narrows Acquisition 3 - Twisp River 2018-202	REL 161	AI	Acquisition	Postponed Indefinitely - 2018
Newby Narrows Acquisition 4 - Twisp River 2018-203		REL 161	AJ	Acquisition	On-Going	
Upper Twisp	Scaffold Camp Project	Scaffold Camp Acquisition 2 - Twisp River Right Bank 2017-159	REL 161	AF	Acquisition	Completed - 2018
	Twisp River War Creek Bridge Project	Twisp River - War Creek Area Restoration Design 2015-148	REL 142	AI	Design/Engineering	Extended to CY19
			REL 169	U	Design/Engineering	On-Going
Upper Twisp River USFS Projects	Upper Twisp River and Tributaries Project Design (USFS Projects) 2016-162	REL 142	AH	Design/Engineering	Completed - 2018	
Middle Methow	UC Support Services	Twisp to Carlton River Recreation Assessment 2017-174	REL 142	AG	Assessment	Completed - 2018
	M2 TCR Projects	M2 Twisp To Carlton Projects Design 2017-191	REL 142	AS	Design/Engineering	Completed - 2018
M2 Alder Creek Floodplain Design 2019-201		REL 169	Y	Design/Engineering	On-Going	
Upper Methow	Hancock Springs Project	Hancock Springs - Lower Creek - Design 2009-14	REL 142	AE	Design/Engineering	Postponed Indefinitely - 2018
	Upper Methow Fawn Creek Project	Fawn Creek Project - Design 2015-147	REL 142	AD	Design/Engineering	Extended to CY19
			REL 169	T	Design/Engineering	On-Going
	Upper Methow Groundwater Slough Acquisition 1 2018-200	REL 161	AG	Acquisition	Completed - 2018	
Methow Weeman Project	Methow Weeman Side Channel Design 2017-189	REL 142	AR	Design/Engineering	Postponed Indefinitely - 2018	

Reach	Generic Project Name	Pisces WE Title	Contract	WE	WE Type	Status
Early Winters	Early Winters Creek 20 Below Project	Early Winters Creek – Twenty Below Construction 2014-117	REL 142	AO	Restoration/Construction	Postponed Indefinitely - 2018
		Early Winters Creek – Twenty Below Construction Management 2014-117	REL 142	AN	Design/Engineering	Postponed Indefinitely - 2018
	Methow Basin EWD Instream Flow Project	Methow Basin EWD Instream Flow Project - Water Rights Assessment 2015-152	REL 142	AP	Water Rights Transfer	Extended to CY19
			REL 169	W	Assessment	On-Going
		Methow Basin EWD Instream Flow Project - Eng. Feasibility Assessment 2015-152	REL 142	AQ	Design/Engineering	Extended to CY19
		REL 169	X	Design/Engineering	On-Going	
Wolf Creek	Wolf Creek Pond Project	Wolf Creek Ponds Design 2017-188	REL 142	AT	Design/Engineering	Postponed Indefinitely - 2018

### Entiat Subbasin Summary Table

Reach	Generic Project Name	Pisces WE Title	Contract	WE	WE Type	Status
Mad River	Tillicum Fan Project	Tillicum Creek Fan Engineering 2016-161	REL 142	G	Design/Engineering	Completed - 2018
		Tillicum Creek Fan Construction Oversight 2016-161	REL 142	H	Design/Engineering	Completed - 2018
		Tillicum Creek Fan Construction 2016-161	REL 142	I	Restoration/Construction	Completed - 2018
	YN Reach Assessment	Mad River Reach Assessment 2017-172	REL 142	J	Assessment	Completed - 2018
Upper Middle Entiat	Entiat Stillwaters Project	Entiat Upper Stillwaters USFS Design 2017-167	REL 142	E	Design/Engineering	Extended to CY19
Middle Entiat	Entiat Stormy A	Stormy Area A - USFS Re-Design 2014-125	REL 142	F	Design/Engineering	Extended to CY19
	Entiat Stormy A	Stormy Area A - USFS Re-Design 2014-125	REL 169	E	Design/Engineering	On-Going

## Wenatchee Subbasin Summary Table

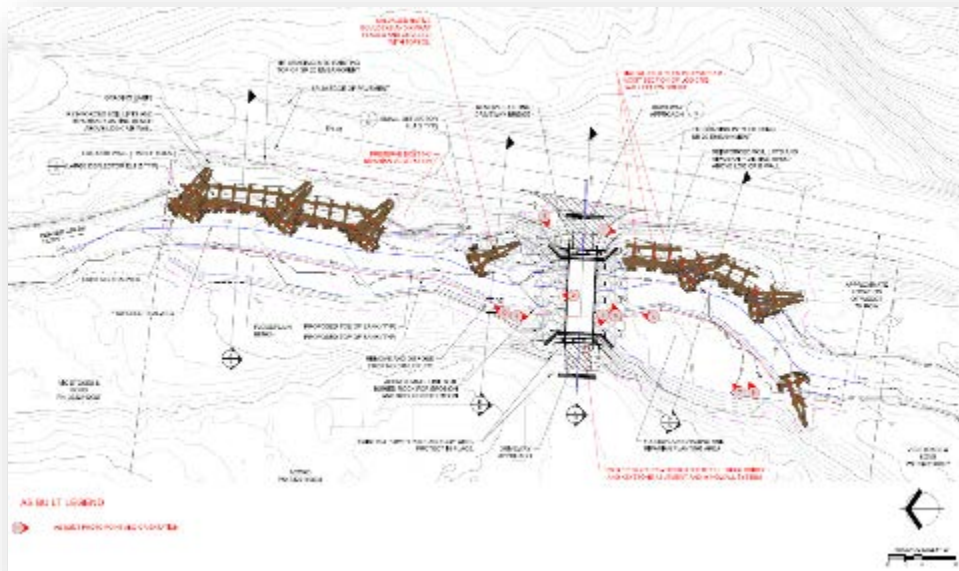
Reach	Generic Project Name	Pisces WE Title	Contract	WE	WE Type	Status
Lower Wenatchee	Leavenworth Area Projects	Leavenworth Area Design 2017-185	REL 142	L	Design/Engineering	Delayed 2018
			REL 169	H	Design/Engineering	On-Going
	Lower Wenatchee Reach 3 Projects	Lower Wenatchee River Reach 3 Design 2017-186	REL 142	M	Design/Engineering	Delayed 2018
			REL 169	I	Design/Engineering	On-Going
Nason Creek	YN Reach Assessment	Upper Nason Habitat Assessment 2017-192	REL 142	N	Assessment	Completed - 2018
	Nason Kahler Project	Upper Kahler - Design 2017-166	REL 142	O	Design/Engineering	Extended to CY19
	Nason Creek N1 Project	Nason Creek N1 DOT Design 2018-198	REL 169	M	Design/Engineering	On-Going
Peshastin Creek	Peshastin RM 2.7 Project	Peshastin RM 2.7 - Design 2016-160	REL 142	P	Design/Engineering	Completed - 2018
		Peshastin RM 2.7 - Construction Management 2016-160	REL 142	Q	Design/Engineering	Completed - 2018
		Peshastin RM 2.7 - Construction 2016-160	REL 142	R	Restoration/Construction	Completed - 2018
Upper Wenatchee	Nason Confluence Project	Nason Confluence - Design 2013-105	REL 142	T	Design/Engineering	Extended to CY19
			REL 169	L	Design/Engineering	On-Going
	Skinney Creek Project	Skinney Creek Design 2015-144	REL 142	S	Design/Engineering	Extended to CY19
			REL 169	J	Design/Engineering	On-Going
	Chiwawa Fan Project	Chiwawa Fan - Design 2016-165	REL 142	U	Design/Engineering	Extended to CY19
			REL 169	K	Design/Engineering	On-Going
Dead Horse Tunnel Project	Upper Wenatchee Deadhorse Tunnel Design 2012-103	REL 142	AU	Design/Engineering	Extended to CY19	
Lower Icicle	UC Support Services	Lower Icicle River Recreation Assessment 2017-170	REL 142	K	Assessment	Delayed 2018

## *Methow Subbasin Details*

### Beaver Creek Assessment Unit

#### Beaver Creek DOT Project (Completed Restoration Action)

***Land Ownership: Private / Washington State Department of Transportation (WSDOT)***



#### ***Detailed Map of Project Site:***

For details about the location of project elements on the site please refer to Attachment 1 – Constructed Projects As-Built.

#### ***Summary:***

This project was identified in the 2017 Beaver Creek Reach Assessment and was subsequently developed under a partnership framework between WSDOT and Yakama Nation Fisheries. Artificial floodplain fill associated with an existing private bridge at the project location caused a major constriction of the Beaver Creek floodway which caused intensive erosion along the left bank of the creek along the embankment of State Highway 20. WSDOT had identified this site as a candidate site for intensive riprap treatments so we partnered with WSDOT to develop a more fish friendly and process based restoration treatment that dissuaded the need for riprap and greatly improved instream complexity and floodplain function in this stretch of Beaver Creek.



The project included replacing the private undersized bridge with a new 60 foot span bridge and removing the floodplain constricting fill that was in place to support the old bridge. 400 linear feet of rootwad complexity elements were then added to the stream corridor through either log cribs or habitat ELJs. Additional excavation of perched areas of the floodplain were also conducted to improve floodplain connectivity. Intensive vegetation restoration was done on all disturbed areas to promote rapid recolonization of the site by woody riparian species such as cottonwood, willows, and dogwoods.

***Restoration Metrics:***

Replacement of an undersized 40 foot span bridge with a 55 foot span bridge that allowed removal of 700 cubic yards of artificial floodplain fill.

Installation of four habitat log structures with associated scour pools.

Installation of 2 root wad faced log crib structures to recreate a left bank floodplain.

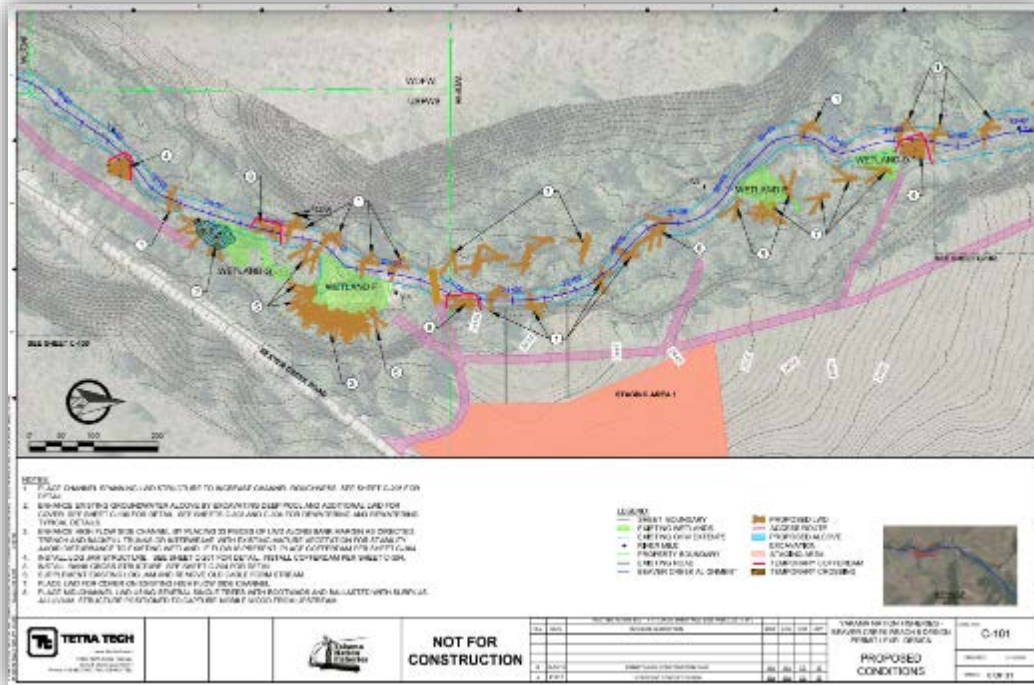
Excavation of a new 2 year inundation floodplain bench on the right bank of the creek.

Intensive native vegetation restoration to restore shading and future wood recruitment into Beaver Creek.



## Beaver Creek Reach 5 Project (Engineering Only)

*Land Ownership: WDFW / USFWS*



### Summary:

In 2018 we continued designs of the Beaver Creek Reach 5 project that was initially started in the fall of 2017. Based on the recommendations from the 2017 Beaver Creek Reach Assessment, we drafted detailed restoration plans for an extensive portion of Beaver Creek on WDFW lands from rivermile 7 to 9.5. Project opportunities in this area still include restoring floodplain connectivity, side channel enhancements, stream bank restoration, and large wood enhancements. We have been meeting regularly with WDFW to review the project designs and are planning on implementation for the 2 mile stretch of creek in 2019 under the framework of the WDFW/YN MOU.

## Lower Chewuch Assessment Unit

### Chewuch RM 15.5 to 20 Project (Completed Restoration Action)

*Land Ownership: United States Forest Service (USFS)*



#### **Detailed Map of Project Site:**

For details about the location of project elements on the site please refer to Attachment 1 – Constructed Projects As-Built.

#### **Summary:**

Engineering, design, and permitting phases of this project were completed in 2016, and the project was implemented from river mile 15.5 to 17 in 2017 and from river mile 17 to 20 in 2018.

In 2018 we completed implementation of the river mile 17 to 20 section of the project zone which consisted of constructing ten main channel log structures. Some additional areas in the original 2017 project design were not completed in 2018 due to a 50 year flood event which naturally changed the wood loading in some side channels previously identified for restoration actions in 2018.

In 2017 we completed implementation of the rivermile 15.5 to 17 section of the project zone which consisted of constructing seven main channel log structures and developing a side channel inlet to reconnect flows into a 2,800 foot long side channel. At the conclusion of conducting side channel construction activities in 2017, perennial flow was restored into the side channel system. Large wood structures were installed in the project reach to improve channel margin cover habitat, capture other large woody debris transporting in the river during spring floods, and to create diverse hydraulic conditions that promote pool scour and gravel sorting.

Many of the structures were completed with whole green trees extracted from the surrounding forest.

***Restoration Metrics:***

2018:

Seven partially buried bank log structure were installed for cover habitat and to promote retention of scour pools in the bed of the Chewuch River. A large portion of the wood used to create the structures were whole trees collected on-site.

Two main channel large wood structures installed to promote lateral channel migration, natural wood recruitment, and increased floodplain inundation.

Two whole trees placed in an existing side channel to provide increased cover habitat.



## Chewuch Rivermile 4.6 Project (Engineering Only)

### Land Ownership: Washington Department of Fish and Wildlife (WDFW)



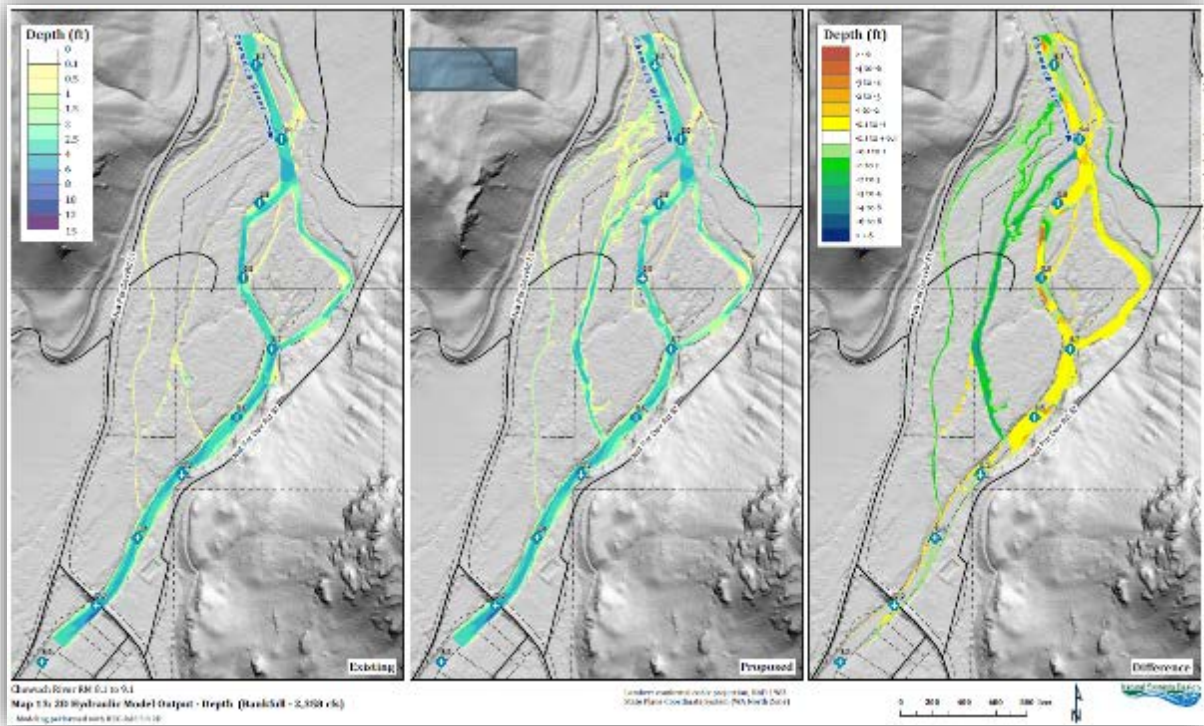
### Summary:

In 2017 we started collecting data and drafting restoration concepts for a section of WDFW owned floodplain at rivermile 4.6 in the Chewuch River. In 2018 we continued developing permit level designs in coordination with WDFW under the framework of the WDFW/YN MOU. Project opportunities identified for this site in the 2010 Lower Chewuch Reach Assessment include floodplain connectivity, side channel enhancements, stream bank restoration, and large wood enhancements.

This site is proposed to be monitored for pre-treatment conditions under the new Upper Columbia Monitoring Project being developed by Yakama Nation Fisheries. To allow for 2 years of pre-treatment data collection the project is being scheduled for 2021 implementation.

## Chewuch Rivermile 8 to 9 Project (Engineering Only)

*Land Ownership: WDFW / Private*



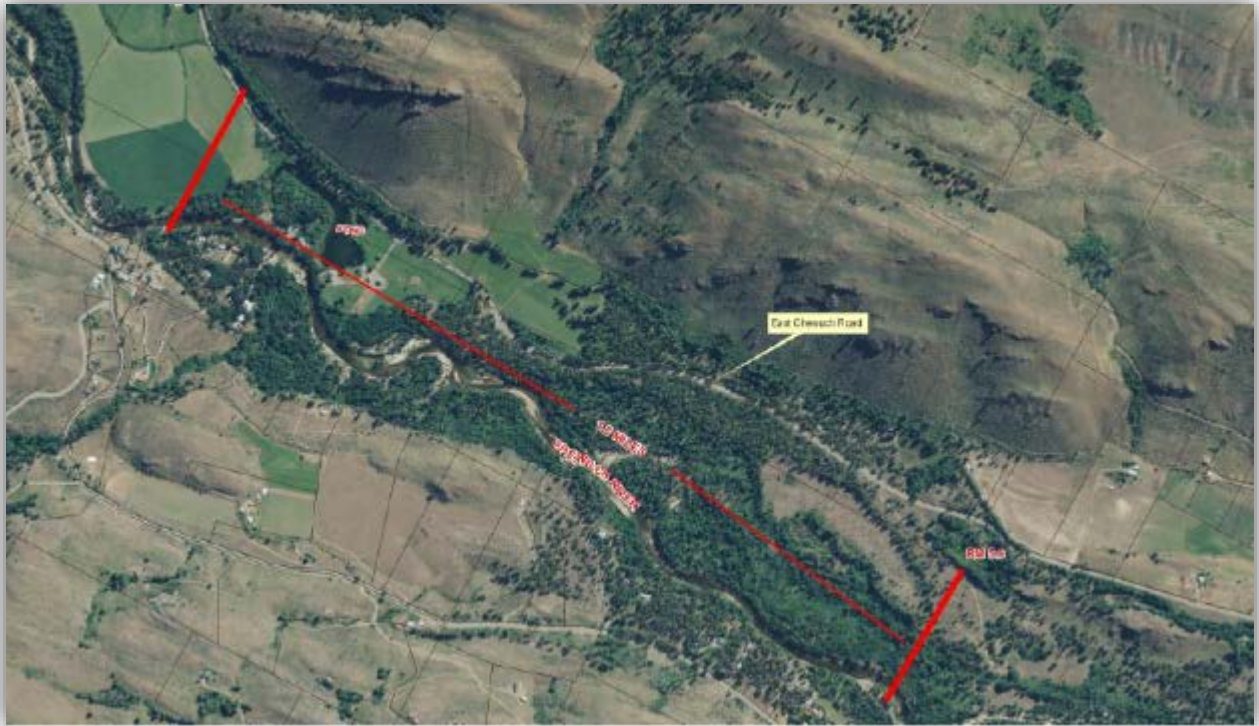
### **Summary:**

In 2017 we started collecting data and drafting restoration concepts for a section of WDFW and privately owned floodplain between rivermile 8 and 9 in the Chewuch River. In 2018 we completed developing concepts for the project area in coordination with WDFW under the framework of the WDFW/YN MOU. Project opportunities identified for this site include floodplain connectivity, side channel enhancements, stream bank restoration, and large wood enhancements.

The project concepts are now being reviewed by the private landowner and some of the project elements may require and land acquisition to be completed.

## Chewuch Floodplain Project (Engineering Only)

*Land Ownership: Private*



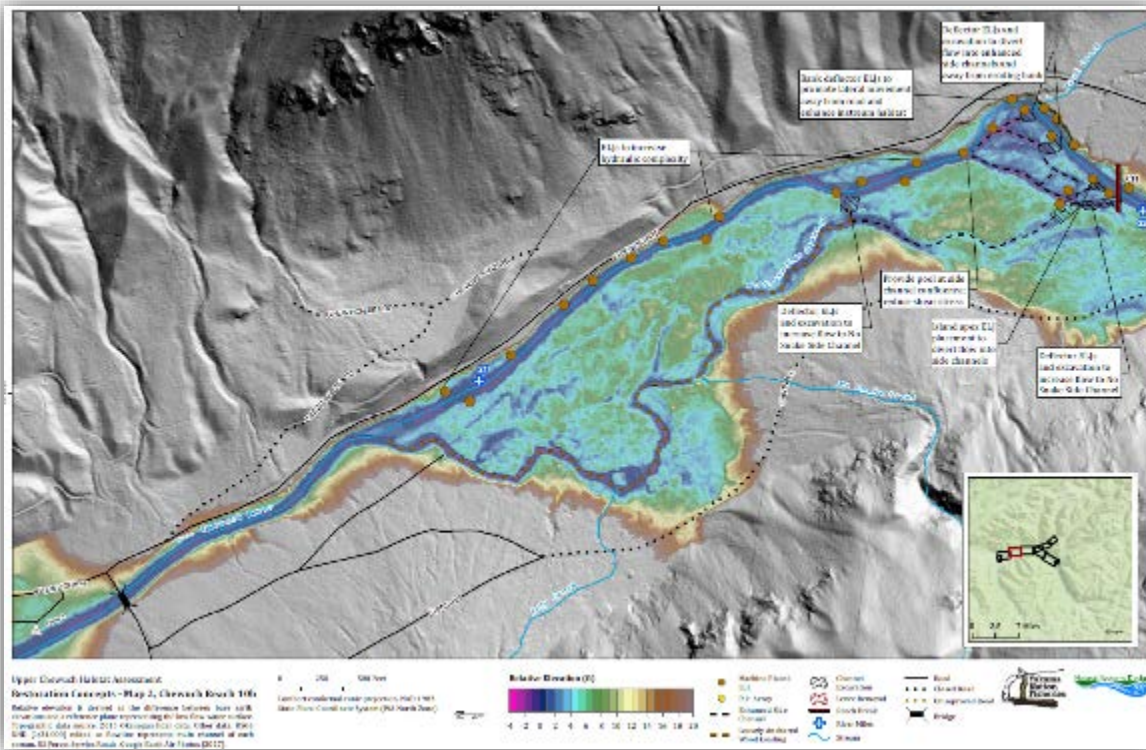
### **Summary:**

In calendar year 2019 the Yakama Nation is seeking to acquire a private property along the Chewuch River containing 1.6 miles of Chewuch River waterfront from rivermile 5.6 to 7.2. Under a cooperative agreement with the Yakama Nation, the Western Rivers Conservancy purchased the 328 acre property from a private seller so that the Yakama Nation could have time to acquire the entire acreage using funding from the BPA Fish Accords. In 2018 we started collecting data and drafting restoration concepts for this property to help inform land management and resale decisions as the acquisition process moves forward. Further design work will be conducted in this project area in 2019.

## Upper Chewuch Assessment Unit

### Upper Chewuch River Habitat Assessment (Completed)

#### Land Ownership: USFS



#### Summary:

In 2017 and 2018 we partnered with the USFS to conduct a comprehensive evaluation of stream habitat conditions in the anadromous bearing portions of the Upper Chewuch River Assessment Unit and several tributaries, including Boulder Creek. This project didn't get underway until October 2017, so most work was conducted in 2018.

This assessment identified multiple large scale salmon habitat restoration opportunities throughout the Upper Chewuch Assessment Unit, including side channel reconnection opportunities, floodplain reconnection opportunities, and main channel complexity restoration. In 2019 we will continue to work with USFS managers to develop restoration actions as prescribed in the 2018 assessment for possible 2022 implementation.

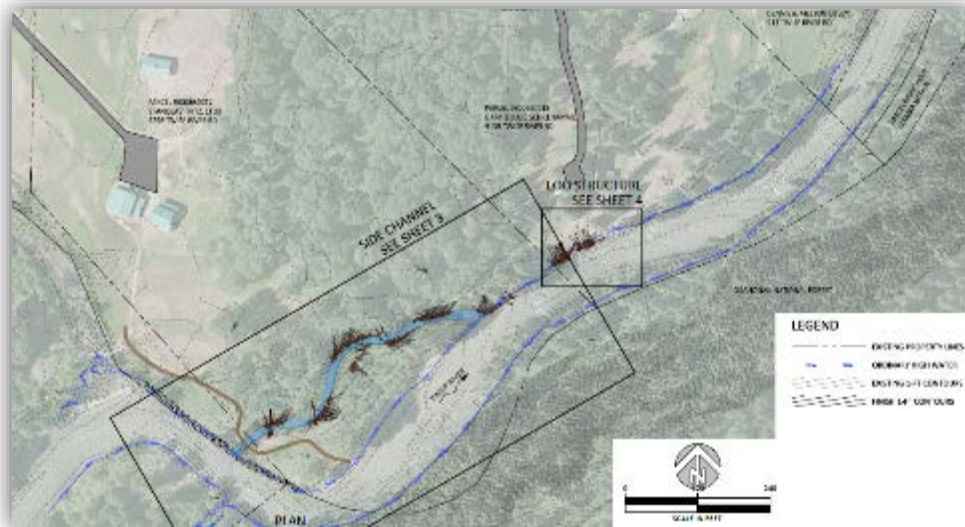


## Lower Twisp Assessment Unit

### Middle Twisp Reach – (Lower and Upper Twisp Assessment Units)

#### Horseshoe Side Channel Phase 1 (Completed Restoration Action)

*Land Ownership: Private*



#### **Detailed Map of Project Site:**

The As-Built Plans for this project site will be provided in 2018 when implementation is completed.

**Summary:**

In 2017 we completed construction of a large alcove side channel and the installation of multiple bank buried large wood structures in the main channel of the Twisp River near rivermile 11. In 2018 we returned to this site to install a culvert within an existing armored bank at the upper end of the alcove to create a perennial surface flow channel.

During the winter of 2017/2018 groundwater discharge into the alcove channel persisted at this site, and the channel stayed ice free. Now the project has additional connectivity with the main river channel and will be able to maintain scouring flows during spring runoff to keep the channel from filling.

This project occurs in close proximity to the Horseshoe Side Channel Phase 2 project area, but is on a separate implementation timeline due to not being influenced by USFS National Environmental Policy Act (NEPA) review timelines.

**Restoration Metrics:**

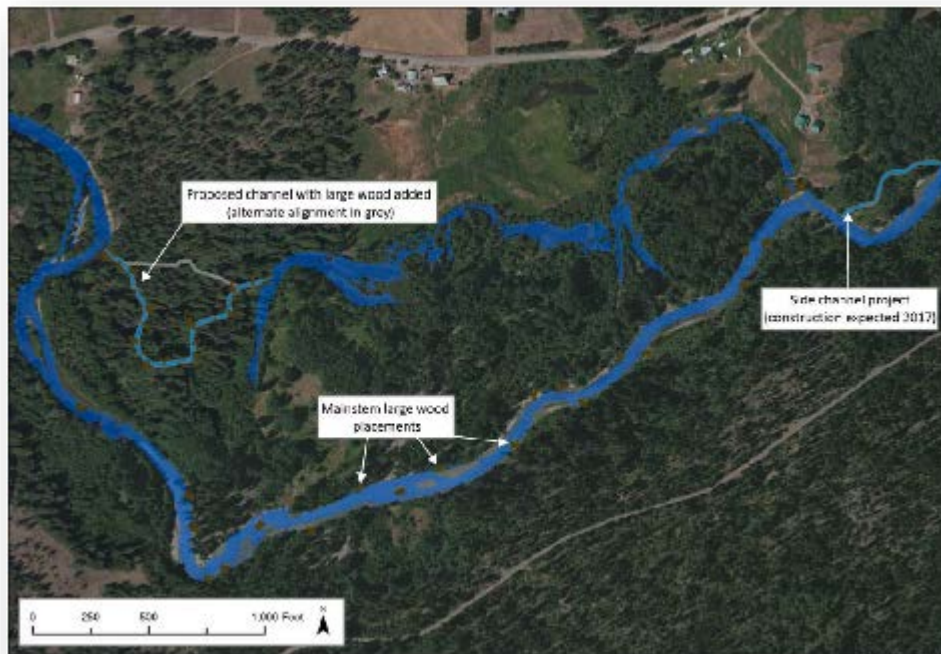
Five hundred feet of perennial flow through side channel was created.

Two main channel margin large wood structures were installed to create bank margin complexity and promote scour pools in the bed of the Twisp River.



## Horseshoe Side Channel Phase 2 (Engineering Only)

*Land Ownership: USFS, Private, and Methow Conservancy*



### **Summary:**

Due to USFS NEPA review timelines and the 2018 Twisp River fire which burned through much of the Upper Twisp River watershed, this project will not be implemented until 2021. However, further design work was completed in 2018 to support a USFS NEPA analysis including wetland impacts modeling.

The project seeks to reconnect a 3,000 foot long groundwater fed side channel complex that crosses USFS lands and adjacent private properties on the left floodplain of the Twisp River near river mile 11.8. The project will divert surface waters from the Twisp River on USFS lands into the upper end of the cut-off side channel complex to restore fish passage into the groundwater fed pools. Levee construction and wood removal in the 1970s caused rampant downcutting of the river channel in this section of the Twisp River, and this project seeks to restore the floodplain connectivity and enhance off-channel and wetland habitats through reactivation of the floodplain. Select excavation at the upstream end of the project area, coupled with intensive main channel wood treatments will help reconnect flood flows with the Horseshoe Side Channel floodplain and will dramatically increase the amount and quality of juvenile salmonid rearing habitat in the project reach.

## Little Bridge Creek – (Lower Twisp Assessment Unit)

### Little Bridge Creek Project (Engineering Only)

*Land Ownership: USFS*



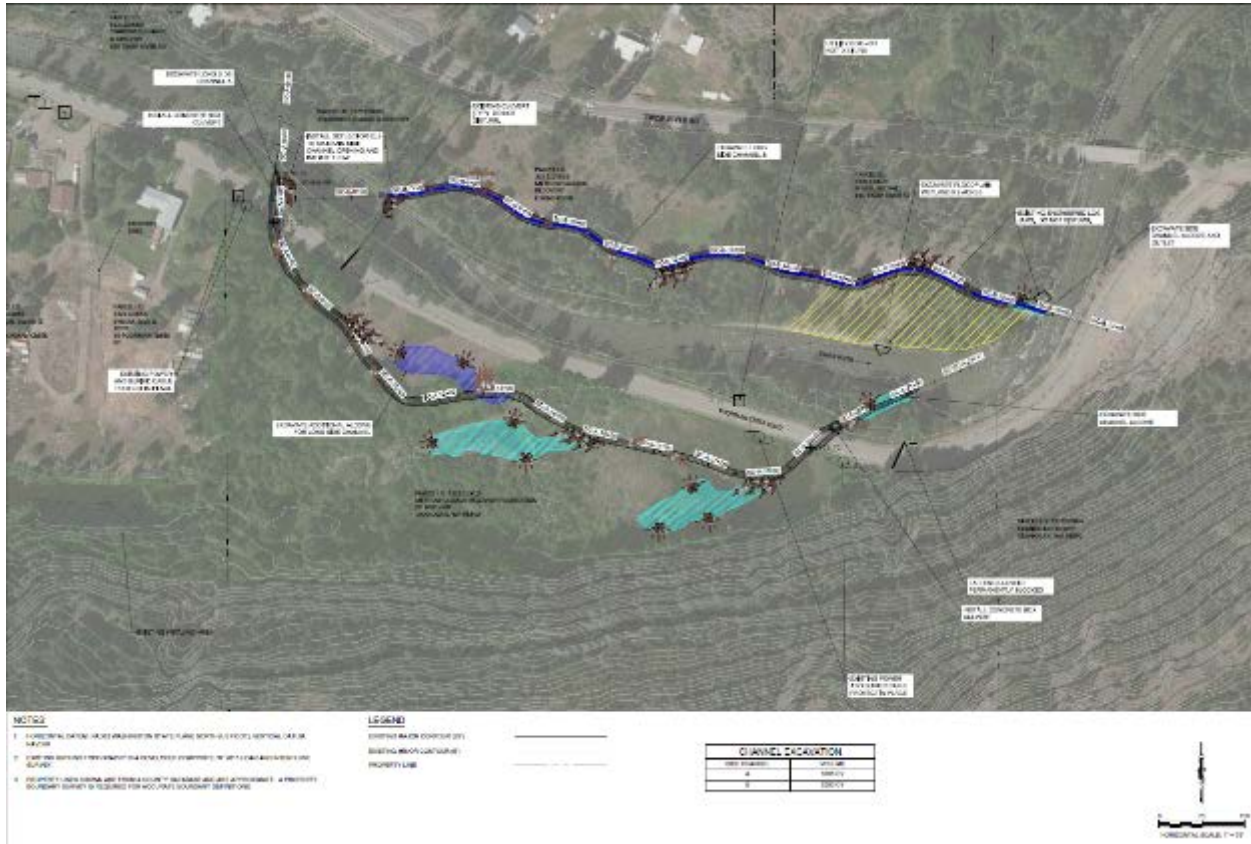
#### ***Summary:***

In 2018 we continued collecting data and completed drafting restoration concepts for the lower portion of Little Bridge Creek based on recommendations contained in the 2017 Upper Twisp River Habitat Assessment. Project opportunities identified for this area include large wood enhancements and inducing better floodplain connectivity using large wood placements brought into the site via helicopter. Implementation is currently planned for 2021. In 2019 we will continue design work to contribute data for the USFS NEPA analysis scheduled for 2019 and 2020.

# Lower Twisp Reach – (Lower Twisp Assessment Unit)

## Twisp Poorman Creek Road Project (Engineering Only)

**Land Ownership: Private, Methow Salmon Recovery Foundation (MSRF)**



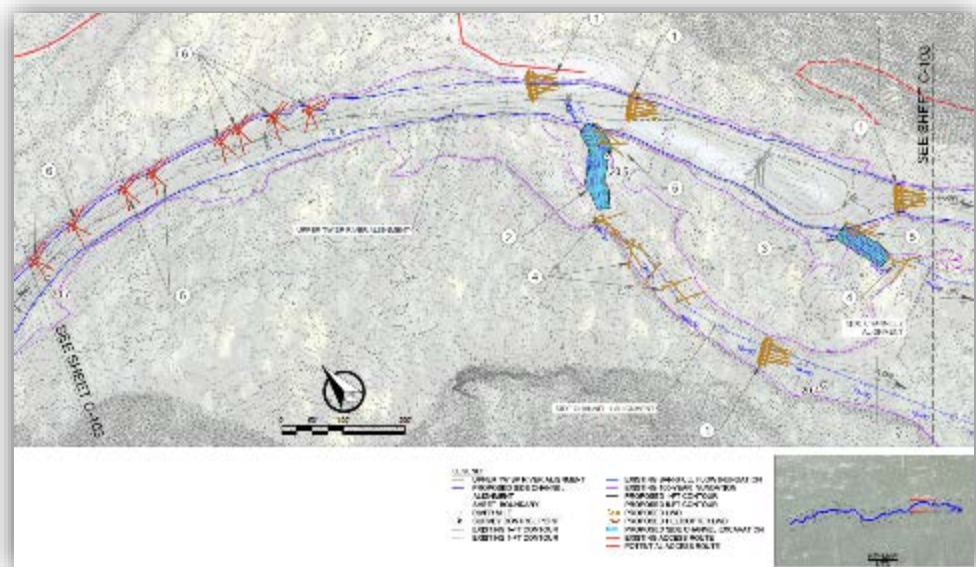
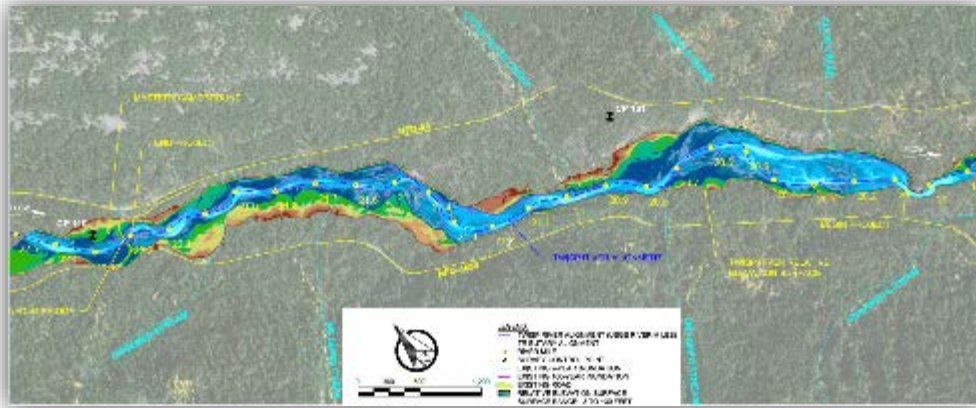
### Summary:

This project utilized topographic data collected in 2010 and extensive groundwater data collected in 2017 and 2018 to determine the feasibility of restoring extensive side channel systems along both banks of the Twisp River near rivermile 2.0. At least six alternative configurations were considered for restoring flood inundation widths and low flow side channel habitats within the project area. Ultimately Yakama Nation Fisheries concluded that all of the alternative configurations had too much associated risk of failure and too high of cost to be feasible. Yakama Nation Fisheries will continue to outreach to adjacent landowners at this site whose properties are now understood to be essential to conduct the highest priority restoration actions.

# Upper Twisp Assessment Unit

## Upper Twisp River Projects – Reach 2 (Engineering Only)

### Land Ownership: USFS

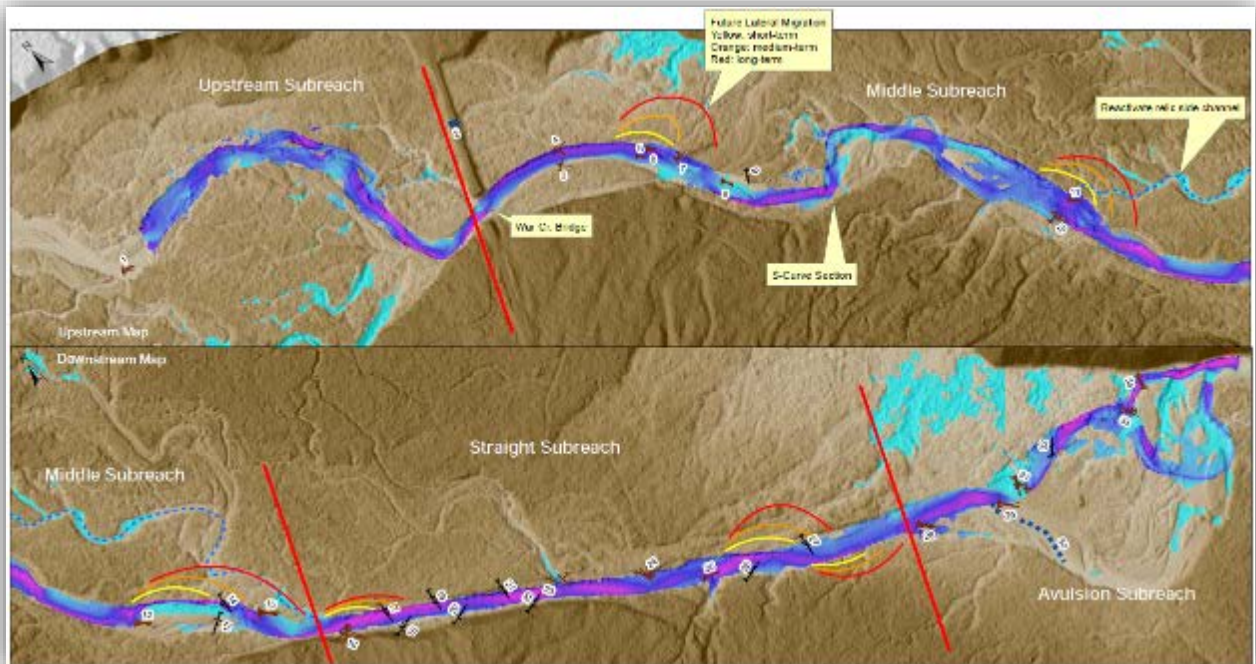


### Summary:

In coordination with USFS staff over 2 miles of the mainstem Twisp River was identified for large wood enhancements and inducing better floodplain connectivity using large wood placements brought into the site via helicopter. The project seeks to restore hydrology to a number of disconnected side channel systems in an area where significant groundwater gains back to the Twisp River promoting high quality spawning habitat for spring Chinook salmon. Implementation is currently planned for 2021. In 2019 we will continue design work to contribute data for the USFS NEPA analysis scheduled for 2019 and 2020.

## Twisp River War Creek Project (Engineering Only)

**Land Ownership: USFS**



### **Summary:**

Due to USFS NEPA review timelines and the 2018 Twisp River fire which burned through much of the Upper Twisp River watershed, this project will not be implemented until 2021. However, further design work was completed in 2018 to support the upcoming USFS NEPA analysis.

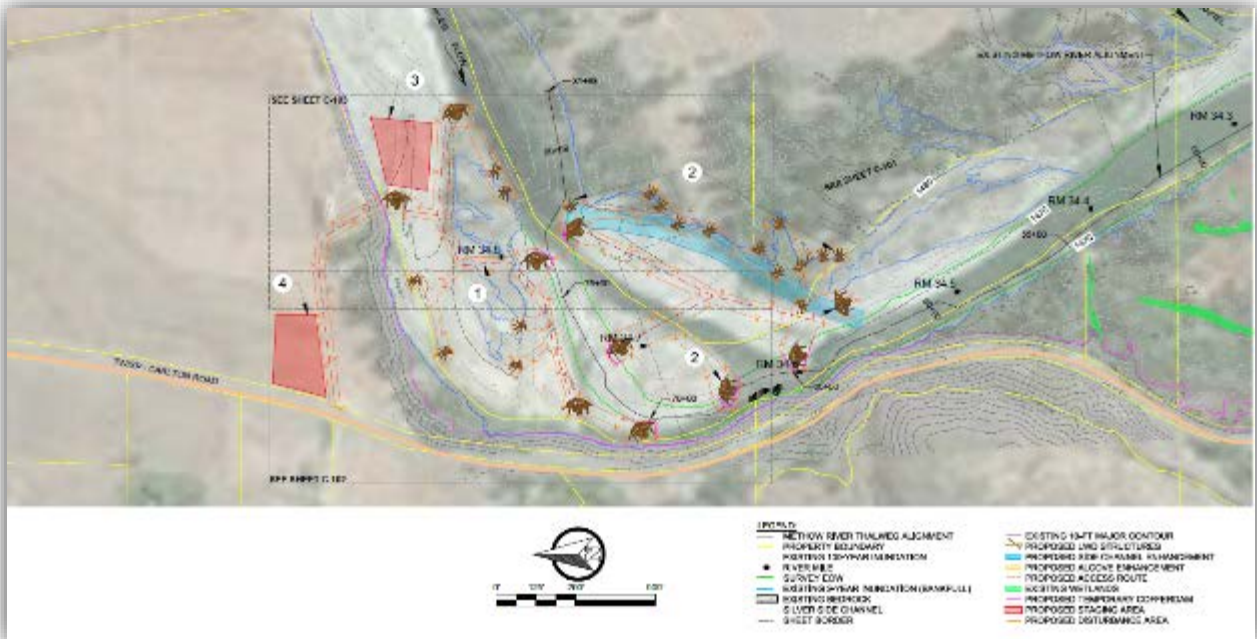
The Twisp River War Creek Project area was identified as a high priority site for addressing ecological concerns in the 2015 Middle Twisp Reach Assessment. The road infrastructure associated with the USFS War Creek Bridge and historic wood removal from the Twisp River have decreased side channel and wetland habitat conditions, instream structural complexity, and bed and channel form. In 2016, in coordination with the USFS, we completed topographic survey, hydraulic modeling, and other data collection activities to produce a concept design report and concept cartoons for USFS evaluation. Implementation is currently planned for 2021. In 2019 we will continue design work to contribute data for the USFS NEPA analysis scheduled for 2019 and 2020.

## Middle Methow Assessment Unit

### Twisp to Carlton Reach – (Middle Methow Assessment Unit)

#### Twisp to Carlton Reach Project (Engineering Only)

*Land Ownership: Private, WDFW, DNR*



#### **Summary:**

Extensive design work was completed within the M2 Twisp to Carlton Reach at three large project sites in 2018. The sites include the Town of Twisp site, the Beaver Ponds Reach, and the Alder Creek Floodplain Reach. Permit level construction designs were created in 2018 for the Alder Creek Floodplain Reach, and implementation of multiple large scale restoration actions are scheduled to occur there in 2020 and 2021. Project actions include side channel restoration, restoring floodplain inundation, and enhancing cover and hydraulic complexity in the mainstem river using large wood features.

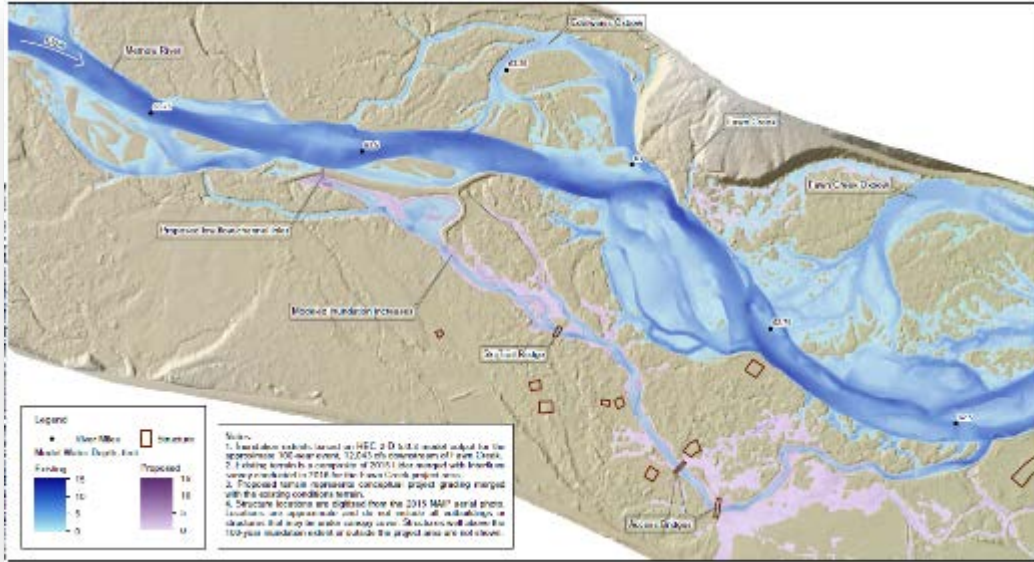
Conceptual designs for the Beaver Ponds project area and the Town of Twisp site were completed in 2018, however these sites are on hold for further design work pending complex landownership constraints. Yakama Nation Fisheries will continue to outreach with landowners in these areas in an attempt to set up large restoration actions in future years.



# Upper Methow Assessment Unit

## Upper Methow Fawn Creek Project (Engineering Only)

**Land Ownership: Private, WDFW, DNR, Okanogan County**



### Summary:

The Fawn Creek site involves at least nine private landowners, as well as Okanogan County, WA DNR, and WDFW. Landowner outreach continues to indicate strong support for large scale restoration actions in this critical spring Chinook and steelhead spawning area.

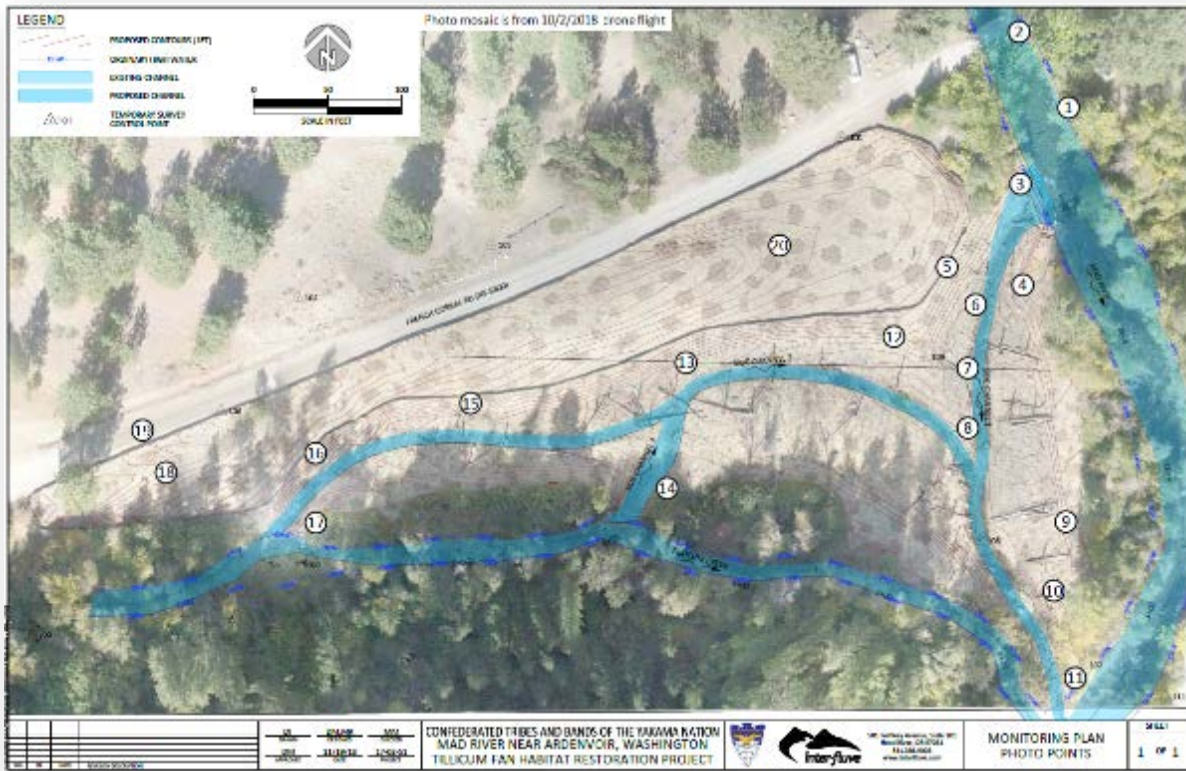
In 2018 we engaged in targeted property acquisitions to allow the most biologically beneficial restoration work to proceed at this site. Acquisition work will proceed into 2019. Potential work in the Fawn Creek area includes extensive side channel reconnection, levee augmentation and/or removal, and mainstem large wood treatments. We plan to continue the design effort in 2019 while coordinating with the multiple landowner and government agency interests that exist at this site.

## Entiat Subbasin Details

### Mad River Assessment Unit

#### Tillicum Fan Project (Completed Restoration Action)

**Land Ownership: USFS**



#### **Detailed Map of Project Site:**

For details about the location of project elements on the site please refer to Attachment 1 – Constructed Projects As-Built.

#### **Summary:**

In 2018 we partnered the USFS Entiat Ranger District to reconnect both Tillicum Creek and the Mad River with the Tillicum Creek alluvial fan floodplain to improve fish habitat. The site was the location of an old homestead and was previously used as a seasonal sheep grazing site. The project created roughly 1,000 feet of new side channel habitat in the old sheep pasture on the alluvial fan, created new perennial side channels to the Mad River, extensively restored native riparian and floodplain vegetation on Tillicum fan, and incorporate new large wood structures into the Mad River and Tillicum Creek to create more complex bank margin habitat.

***Restoration Metrics:***

One 400 foot long perennial side channel created parallel to the Mad River.

One inlet large wood structure on the Mad River.

Numerous new high flow alluvial fan channels connecting to a groundwater fed parallel channel to Tillicum Creek.

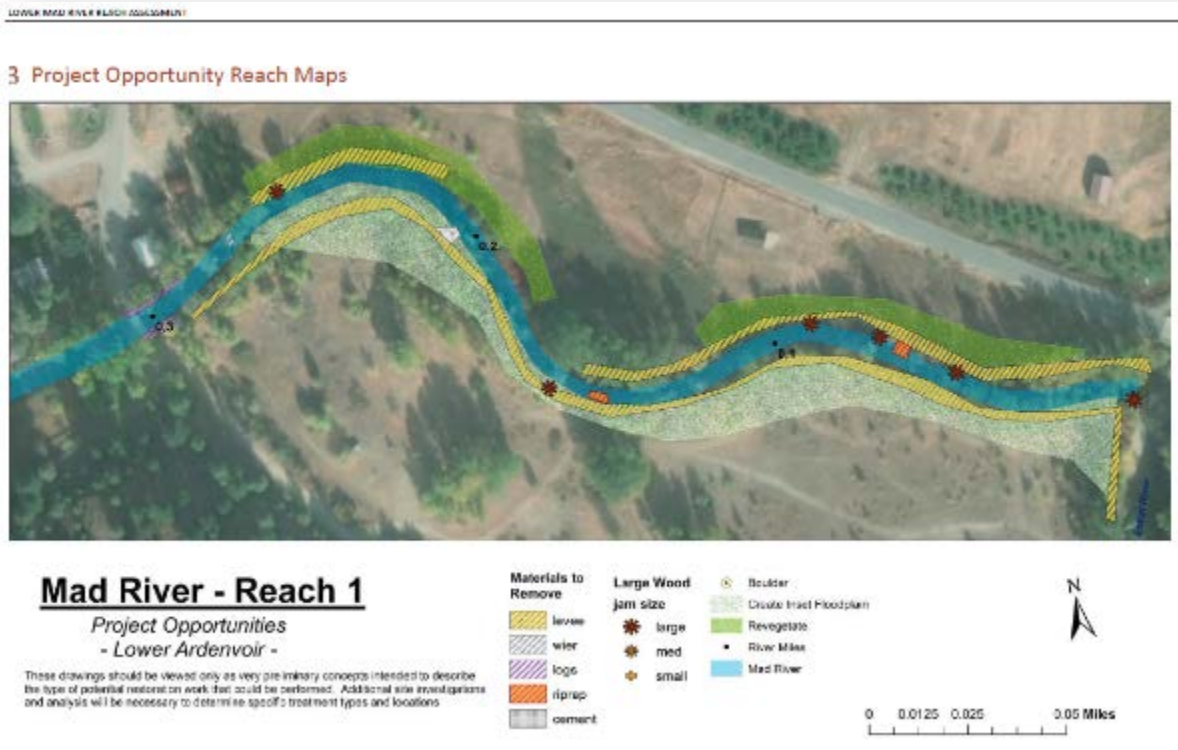
One groundwater fed side channel within the alluvial fan of Tillicum Creek.

Reconstruction of 2.25 acres of alluvial fan floodplain with extensive native plant restoration.



# Mad River Habitat Assessment (Completed)

## Land Ownership: USFS and Private



### Summary:

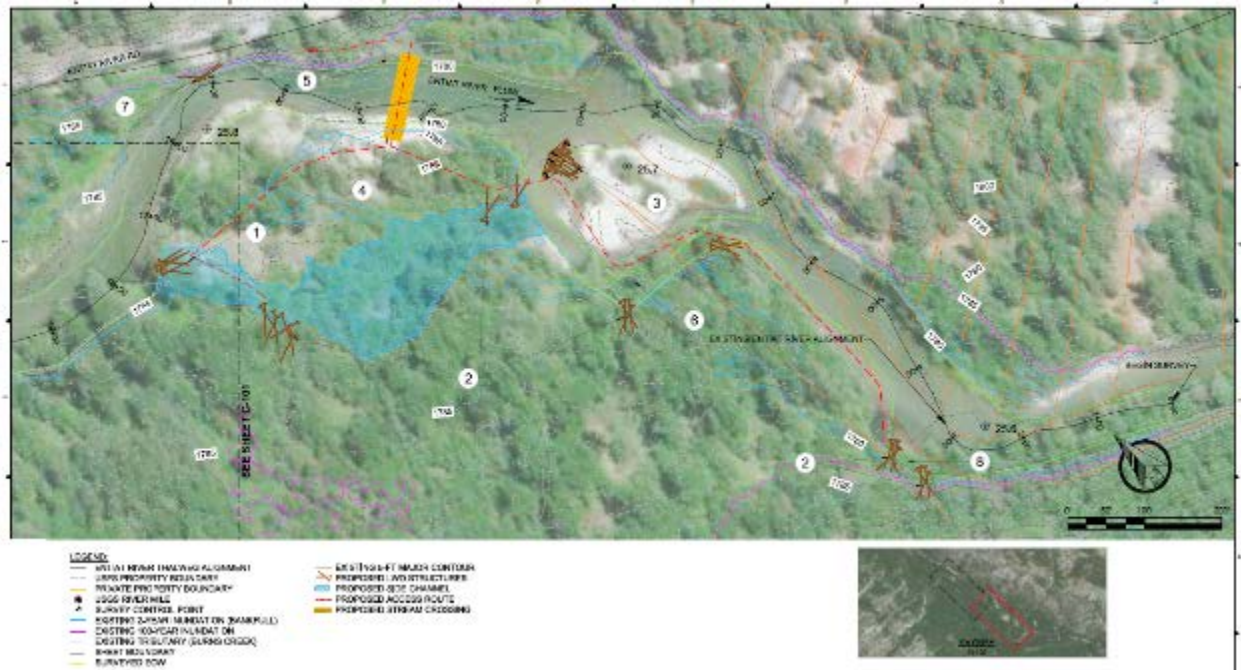
In 2017 and 2018 we partnered with the USFS to conduct a comprehensive evaluation of stream habitat conditions in the lower section of the Mad River where most anadromous fish use takes place. This project didn't get underway until October 2017, so most work was conducted in 2018.

This assessment identified multiple large scale salmon habitat restoration opportunities in the Mad River Assessment Unit, including side channel reconnection opportunities, floodplain reconnection opportunities, and main channel complexity restoration. In 2019 we will continue to work with USFS managers to develop restoration actions as prescribed in the 2018 assessment for possible 2022 implementation.

# Upper Middle Entiat Assessment Unit

## Entiat Stillwaters Project (Engineering Only)

*Land Ownership: USFS and Private*



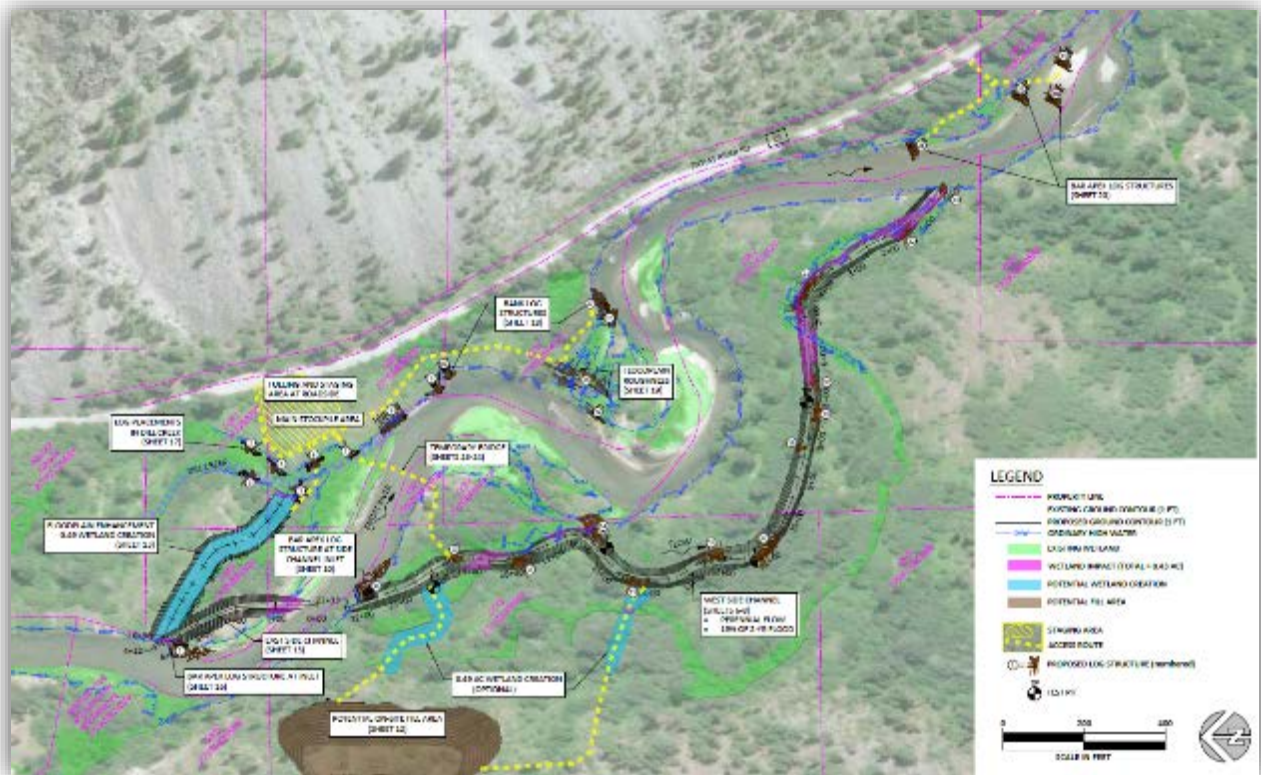
### **Summary:**

In 2017 we constructed habitat features at the Signal Peak and Upper Burns restoration sites within the Stillwaters Reach of the Entiat River. Based on this success, in 2018 we began developing new restoration actions for the rest of the Stillwaters Reach in coordination with USFS staff. In 2018 we completed development of detailed restoration concepts for four major project sites totaling 2.7 rivermiles in the Upper Middle Entiat Assessment Unit. In 2019 we will be developing final restoration designs to complete restoration actions on 2 of the 4 sites in 2020.

# Middle Entiat Assessment Unit

## Entiat Stormy A Project (Engineering Only)

*Land Ownership: USFS and CDLT*



### Summary:

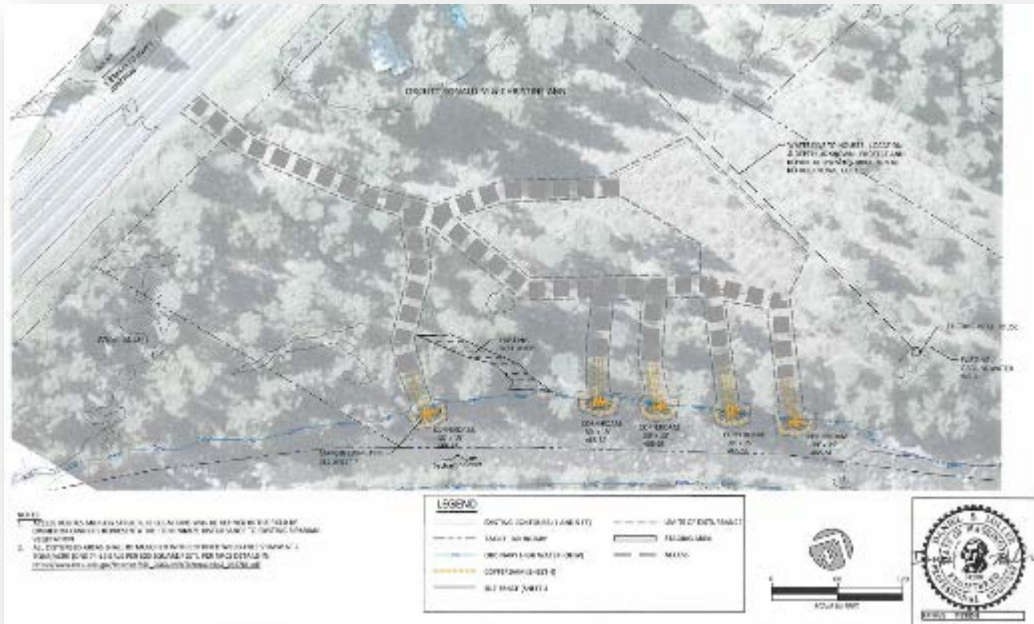
In 2018 we completed development of permitting plans for the 1 mile long Stormy Area A project site along the Entiat River in the Middle Entiat Assessment Unit. This project is scheduled to be implemented in 2019 and will restore over 2,000 linear feet of perennial side channel habitat, reintroduce large wood cover habitat to the mainstem, and restore acres of floodplain connectivity in an area where historic wood removal and channel downcutting has degraded salmon habitat over recent decades.

## Wenatchee Subbasin Details

### Peshastin Creek Assessment Unit

#### Peshastin Creek RM 2.7 Project (Completed Restoration Action)

##### Land Ownership: Private



##### Detailed Map of Project Site:

For details about the location of project elements on the site please refer to Attachment 1 – Constructed Projects As-Builts.

##### Summary:

Side channel restoration concepts were developed for this project area in 2016, however permitting delays postponed groundwater testing for this project site until 2017, so the projected restoration implementation was delayed to 2018.

In late 2017 we completed groundwater testing at the site and determined that the most biologically beneficial side channel restoration actions were not possible due to low channel gradients and deeper than anticipated low flow groundwater depths. Despite the lack of side channel opportunities, we did move forward with constructing five bank margin large wood habitat structures along Peshastin Creek in 2018 to improve rearing habitat conditions at the site. This project ended up creating five new

scour pools within the creek bed and added 45 pieces of large wood to the left bank of Peshastin Creek in contact with low water surface flows.

***Restoration Metrics:***

Five partially buried bank log structures were installed for cover habitat and to promote retention of scour pools in the bed of the Peshastin Creek.

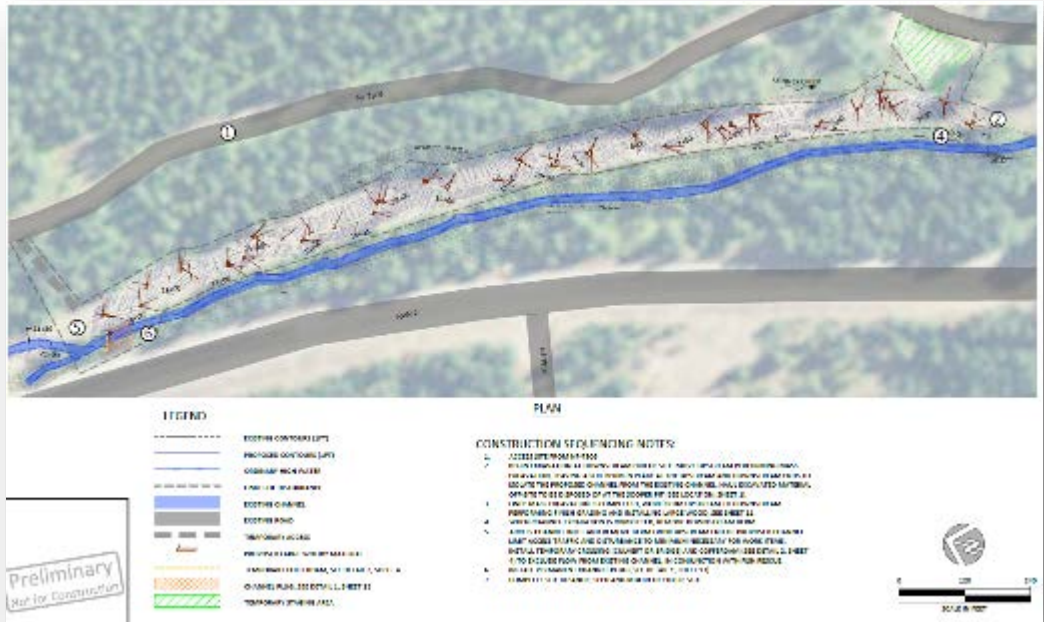




# Upper Wenatchee Assessment Unit

## Skinney Creek Project (Engineering Only)

**Land Ownership: USFS**

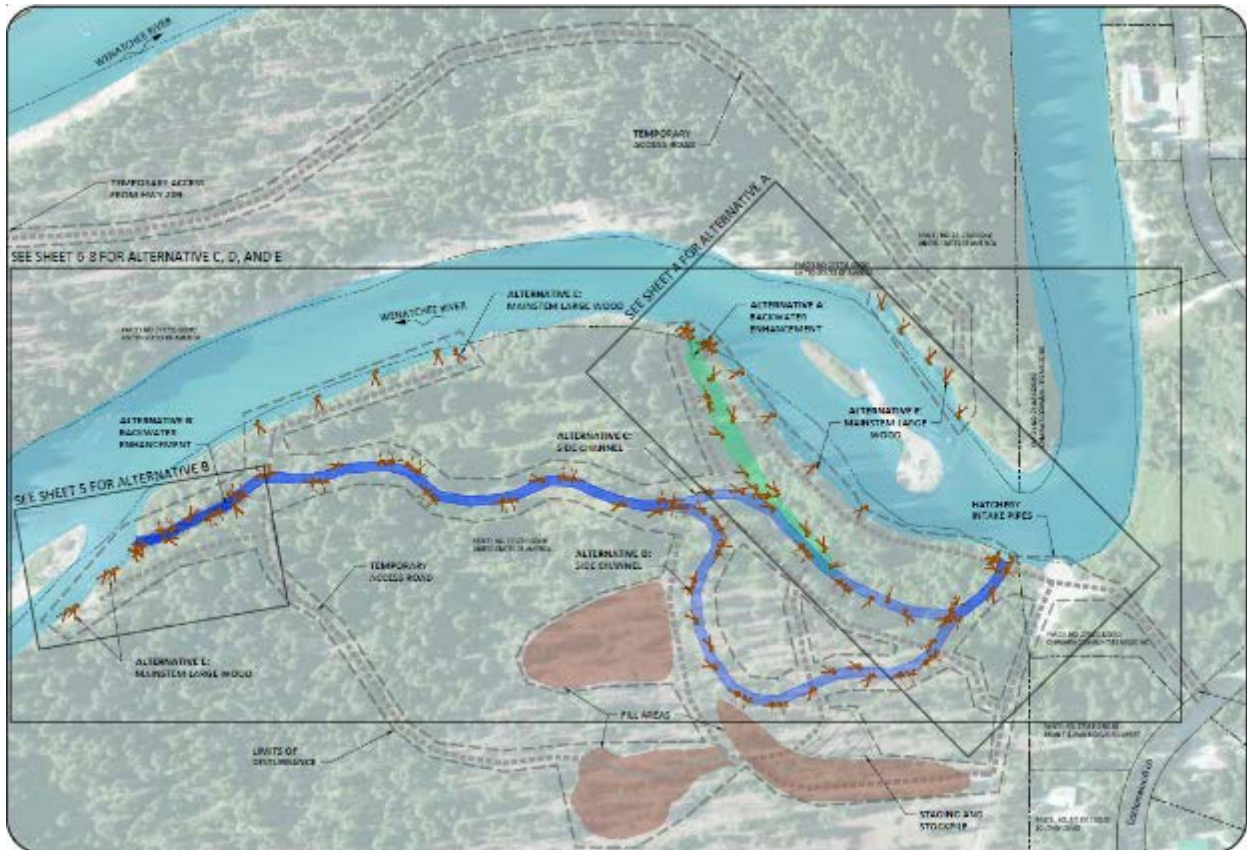


### Summary:

In 2018 we produced a detailed design plan for the Skinney Creek project site that was scheduled to be implemented in 2019. However, as the USFS initiated its NEPA process for this project, it was determined that the WSDOT wetland mitigation site at the outlet of Skinney Creek was structurally failing and WSDOT recruited the Yakama Nation UCHRP to assist in developing an expanded restoration action for the Skinney Creek project to would stabilize the WSDOT mitigation area. The Yakama Nation and WSDOT have now created a cooperative agreement for developing an expanded project action at this site and now project implementation has been rescheduled to 2020. On-going design work will continue in 2019 to develop final permitting plans and complete the USFS NEPA process.

## Chiwawa Fan Project (Engineering Only)

### Land Ownership: USFS

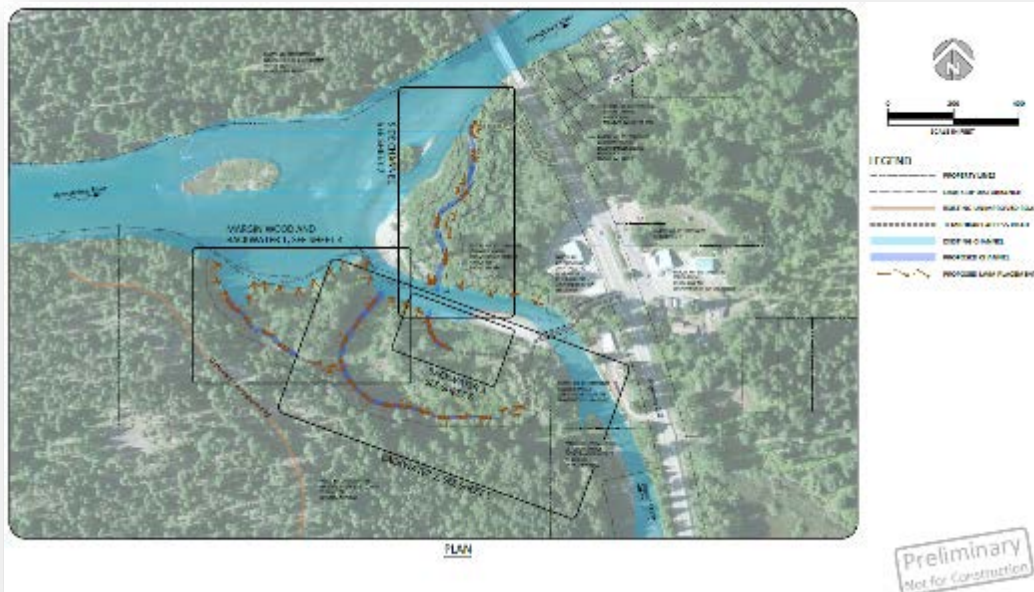


### Summary:

In 2015 we produced multiple detailed concepts for side channel restoration on USFS lands along the toe of the Chiwawa River fan along the Wenatchee River where large wood removal and human development impacts have decreased side channel connectivity. In 2018 we continued development of conceptual alternatives working with USFS staff. We are seeking to restore a 2,000 foot long side channel with perennial flow. In 2018 we implemented a groundwater study plan for the site with USFS staff to determine how a reactivated side channel might interact with groundwater inputs. Groundwater monitoring and additional design work was done 2018 and now USFS is analyzing the results. Design work will continue in 2019 with implementation scheduled for 2021.

## Nason Confluence Project (Engineering Only)

**Land Ownership: USFS**



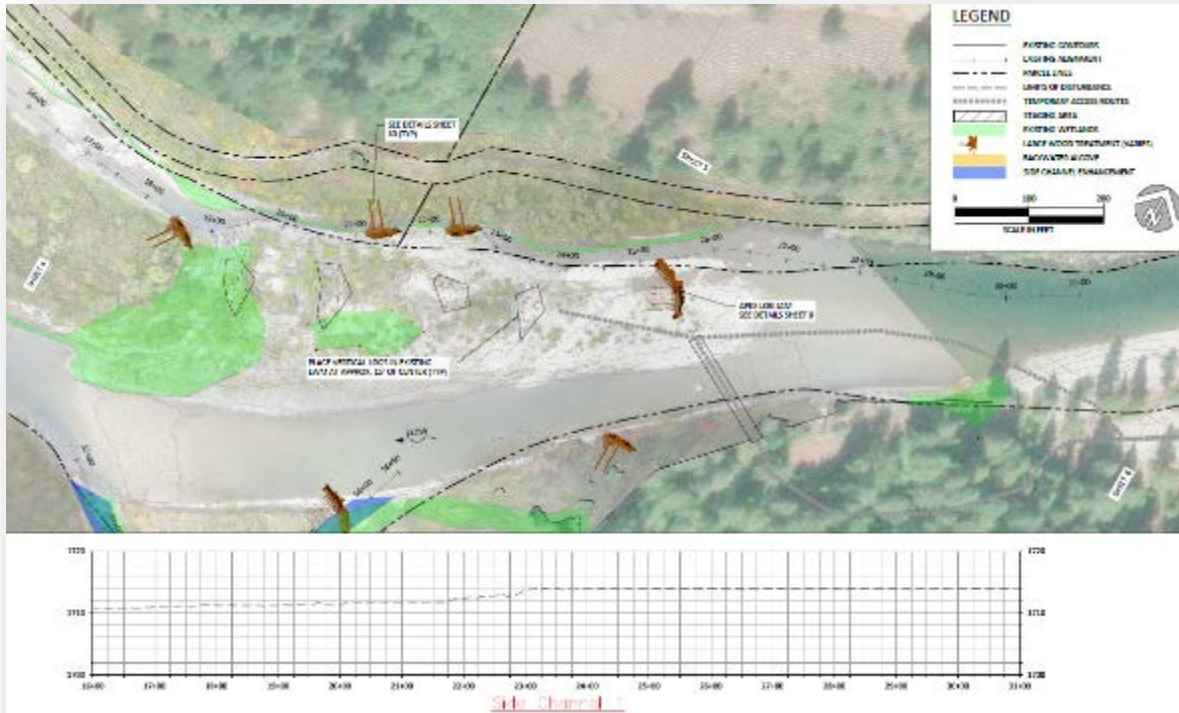
### **Summary:**

In 2015 we produced multiple detailed concepts for side channel restoration on USFS lands at the confluence of Nason Creek with the Wenatchee River where bridge construction, large wood removal, and human development impacts have decreased lateral channel migration and reduced side channel connectivity. In 2018 we continued development of conceptual alternatives working with USFS staff.

In 2018 we implemented a groundwater study plan for the site with USFS staff to determine how side channel actions might interact with groundwater inputs. Groundwater monitoring and additional design work was done 2018 and now USFS is analyzing the results. Design work will continue in 2019 with implementation scheduled for 2020.

# Dead Horse Tunnel Project (Engineering Only)

*Land Ownership: USFS, DNR, and Private*



## **Summary:**

In 2018 we produced multiple detailed concepts for large scale mainstem and side channel restoration actions on USFS, DNR, and private lands in the downstream end of the Upper Wenatchee Assessment Unit. New land ownership in this area, and the USFS's focus on the Upper Wenatchee Assessment Unit for new restoration actions prompted the development of the detailed concepts so that the USFS Upper Wenatchee NEPA process can be used to help permit actions in this high priority restoration area. side channel restoration on USFS lands at the confluence of Nason Creek with the Design work will continue in 2019 with implementation scheduled for 2021.

## Nason Creek Assessment Unit

### Upper Nason Creek Habitat Assessment (Completed)

*Land Ownership: USFS and Private*



#### **Summary:**

In 2017 and 2018 we partnered with the USFS to conduct a comprehensive evaluation of stream habitat conditions in the highest section of Nason Creek where previous assessments have not occurred yet and geomorphic conditions are promising for habitat restoration actions. The study area began at the train bridge over White Pine Road (river mile 14.1) and extends up to White Pine Creek.

This assessment identified multiple large scale salmon habitat restoration opportunities in the Nason Creek Assessment Unit, including side channel reconnection opportunities, floodplain reconnection opportunities, and main channel complexity restoration. In 2019 we will continue to work with USFS managers to develop restoration actions as prescribed in the 2018 assessment for possible 2022 implementation.

## Upper Kahler Project (Engineering Only)

**Land Ownership: Private**



### **Summary:**

In 2018 we developed detailed restoration designs for the Upper Kahler project site to prevent an avulsion induced by land development practices. The avulsion threatened to disconnect hundreds of feet of productive spring Chinook spawning grounds and substantially straighten the thread of the river.

This project was determined to be outside the scope of the HIP III coverage for BPA, so we are seeking alternative methods to implement this project in 2019.

## Nason Creek N1 Project (Engineering Only)

*Land Ownership: USFS, WSDOT, and Private*



### **Summary:**

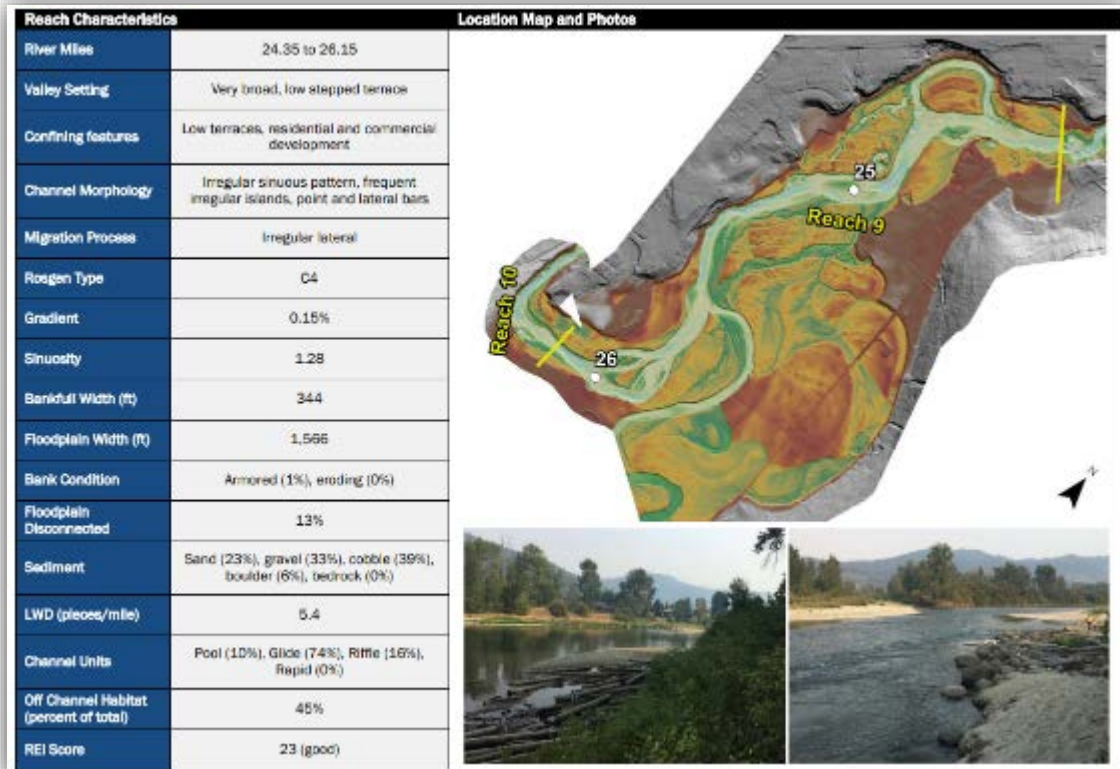
In 2018 we began development of restoration concepts and alternatives for the Nason Creek N1 project site. WSDOT approached the Yakama Nation UCHRP about potential partnership restoration projects in this reach, and Chelan County DNR asked the Yakama Nation UCHRP to develop further alternatives for restoring connectivity to a disconnected oxbow at the upstream end of the project area. In addition, the Yakama Nation UCHRP is working with the Western Rivers Conservancy to secure ownership of the extensive river left floodplain in the N1 project area, which is an area that includes potential side channel restoration opportunities.

We will be working with the multiple other land management and permitting agencies in the N1 project zone to develop detailed restoration concepts in 2019.

## Lower Wenatchee Assessment Unit

### Leavenworth Area Projects (Engineering Only)

*Land Ownership: City of Leavenworth, WDFW, Private*



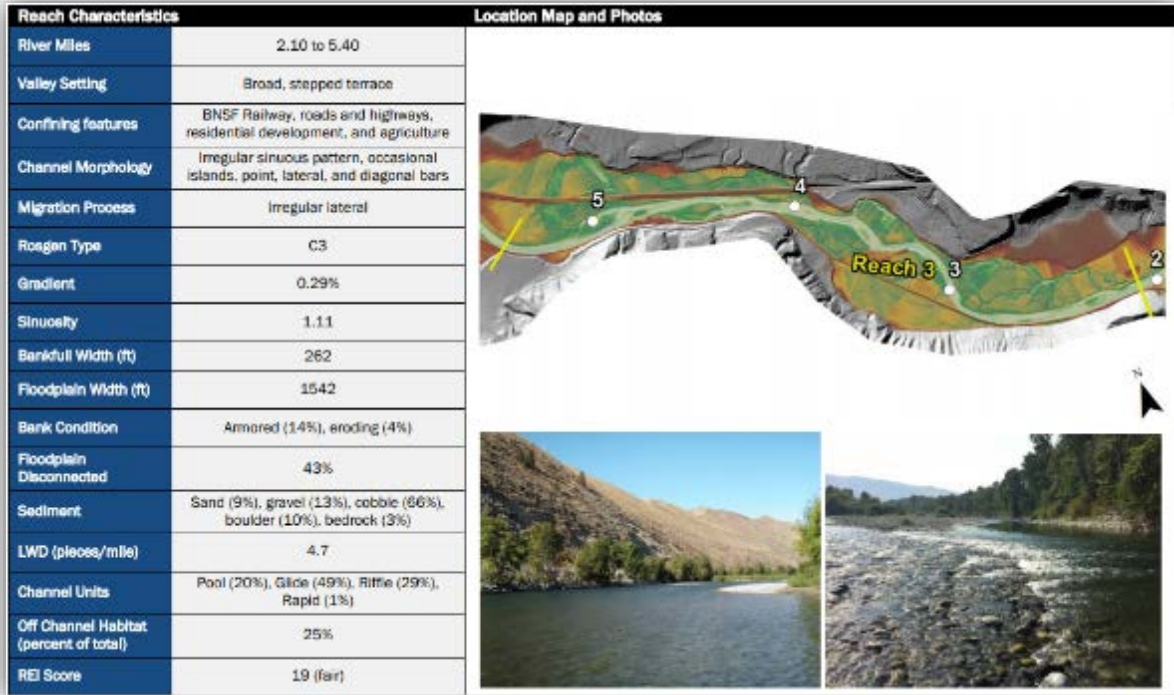
#### **Summary:**

In 2018 we began development of restoration concepts and alternatives for the Leavenworth Area of the Lower Wenatchee Assessment Unit. This area contains some of the highest priority restoration opportunities identified in the 2017 Lower Wenatchee Reach Assessment. In 2018 we conducted some groundwater monitoring to understand the potential for creating new thermal refuge habitat for rearing salmonids. In 2019 we will continue to develop detailed restoration concepts in this project area. Currently there is good support from the City of Leavenworth, WDFW, and large private landowners in the project zone for conducting large scale restoration actions.



## Lower Wenatchee Reach 3 (Engineering Only)

*Land Ownership: Chelan County, CDLT, WSDOT, DNR, and Private*



### **Summary:**

In 2018 we began development of restoration concepts and alternatives for Reach 3 of the Lower Wenatchee Assessment Unit. This area contains some of the highest priority restoration opportunities identified in the 2017 Lower Wenatchee Reach Assessment. In 2018 we conducted some groundwater monitoring to understand the potential for creating new thermal refuge habitat for rearing salmonids. In 2019 we will continue to develop detailed restoration concepts in this project area.

## ***Post-Implementation Monitoring***

### **Objective**

All projects constructed by the YN UCHRP are monitored for multiple years to ensure engineering and stability objectives are achieved. Monitoring is performed by qualified professional engineers using a monitoring plan written by the design team at the completion of construction. The following generalized Scope of Work details the typical monitoring tasks and timelines associated with our monitoring work.

### **Generic Monitoring Scope of Work**

#### ***Create and Provide a Design Report***

The Design Report summarizes project goals, field data collection, and technical design of the project including site survey, hydrology, hydraulics, grading, anchoring, and quantities/totals.

#### ***Produce a Monitoring Plan***

The Monitoring Plan documents the post-construction conditions of the site and will outline future monitoring activities that will be completed. Documentation of post-construction conditions include a description of the completed project, preparation of as-built drawings, and results of initial post-construction monitoring. This information serves as a baseline for comparison to future monitoring data. The plan will also identify specific future monitoring activities and schedule.

Monitoring activities to be described in the plan may include photos, notes/sketches, measurements, ocular sediment data, and other activities depending on the project type and objectives. The monitoring schedule will describe the plan for regular scheduled monitoring as well as for monitoring in response to high water events. There will also be a discussion of site conditions that would trigger action items or interventions/adaptive management.

### ***Monitoring***

Monitoring efforts at the site focus on qualitative post-construction performance and an evaluation of constructed features and associated physical habitats. The monitoring activities and the data collected include: repeat photographs from mapped locations, simple hand measurements and sketches of zones of erosion, scour and sediment deposition. Revegetation will be monitored and documented via photographs and sketches of zones of plant species complexity and vigor. Documentation will be a narrative description with representative photos and sketched graphics as needed to illustrate change.

#### **Monitoring Phase 1- Site Investigation**

##### **Task 1 - Hydrologic history**

River flows are recorded at USGS gages within each watershed the work was performed. A summary of maximum flows between monitoring events should be summarized in each report. Flows at the time of the monitoring effort should be summarized with a comparison to mean

daily discharge. Effort will be made to conduct monitoring at similar flows to provide comparable observation efficiencies and photos.

### **Task 2 - Photo Points**

Locations are identified that will visually document individual features, overall condition and the associated physical habitat. Photo point locations are identified in the as-built reports. Photos are taken at those approximate locations for each subsequent monitoring year.

Notes should be taken of project feature, photo orientation and unique conditions or features the photographs are documenting. Efforts will be made to produce high resolution photos of similar magnification and framing to provide easy visual comparison of project changes for reports and presentations.

### **Task 3 -Field Sketches and Narrative**

At each constructed feature, a field sketch and narrative of any changes from prior monitoring conditions will be completed. Photographs from prior monitoring events will be compared to field conditions to estimate changes. Sketches will be as detailed as possible based on observations and simple measurements and should include a plan and elevation sketch at each location. The as-built reports provide construction plans for use as base graphics for sketches of locations and extents of erosion, scour and deposition areas, accumulation of debris, adjacent river bed and bank conditions and their approximate dimensions relative to the constructed feature. Substrate sizes in scour and deposition zones will be estimated on the percent composition using the Wentworth scale metrics and noted on the sketch. Total number of woody material will be summarized to identify projects are gaining / losing material.

### **Task 4 - Action triggers**

If monitoring activities detect undesirable performance or change to the habitat work, a range of actions or responses may be initiated based on professional opinion.

- No action needed.
- For minor change in function, a flag may be placed in the monitoring report to watch and respond at a later time if the condition worsens.
- Moderate changes may require a recommendation for intervention based on professional opinion and work by YN to remedy the issue.
- Serious changes that would influence human safety or infrastructure may require design and contractor with heavy equipment to remedy the issue.

The findings, recommendation, and decision will be documented in each report year as it becomes necessary.

### **Task 5 - Revegetation areas**

Identify deficiencies in the revegetation efforts for each site, which may include:

- plant species complexity
- plant vigor
- invasive species

The degree of deficiency would be based upon percent of total area, or area of specific problem item. Noted deficiencies in vegetation reestablishment may prompt action to improve site recovery, reduce sediment mobilization and invasive species propagation.

### **Monitoring Phase 2 – Reporting**

#### **Task 6 - Monitoring Report**

Following completion of each round of in the field monitoring, a report will be developed to present the assimilated monitoring notes and photos. The report will include a description of methods including any variation to the monitoring plan and reasons for variation, site conditions at the time of monitoring, and a summary of preceding flow conditions characterized by the record from the USGS gage with a focus on peak events that may have occurred prior to monitoring. The report will include a brief section for each monitored feature including representative photographs from each photo point and a narrative describing the conditions of the habitat feature, noting any changes to the structures or physical habitats between monitoring years.

#### **Monitoring Schedule**

Monitoring should begin the subsequent year following construction to establish changed conditions. Monitoring will typically be conducted in years 1, 2, 3, and 5 following the construction year. The as-built reports will be used for comparison for all future monitoring efforts and will allow for determination of the type and magnitude of change to features over time.

Phase 1 – July through August

Phase 2 – September through December

## Monitoring Actions Performed During the Reporting Period

Sub-basin	Project	Construction Year	Year 1 Monitoring	Year 2 Monitoring	Year 3 Monitoring	Year 5 Monitoring
Entiat	Entiat Stillwaters and 3-D Addition	2017	2018	2019	2020	2022
Methow	Old Schoolhouse - Beaver Creek Project	2013	2014	2015	2016	2018
	Chewuch RM 11.75 to 13 Project (USFS portion)	2013	2014	2015	2016	2018
	Chewuch RM 11.75 to 13 Project (River Right Side Channel)	2015	2016	2017	2018	2020
	Chewuch RM 13 to 15.5 Project (WDFW and USFS)	2015	2016	2017	2018	2020
	Chewuch RM 15.5 to 17 Project (USFS)	2017	2018	2019	2020	2022
	Twisp Poorman Creek Road Project	2014	2015	2016	2017	2019
	Twisp RM 3 Project	2014	2015	2016	2017	2019
	M2 1890s Project	2014	2015	2016	2017	2019
	M2 LWD Project (Sugar Dike)	2013	2014	2015	2016	2018
	M2 LWD Project (Two Channels)	2014	2015	2016	2017	2019
	Fender Mill Side Channel	2015	2016	2017	2018	2020
	Twisp Ponds Left Bank Side Channel	2016	2017	2018	2019	2021
	Twisp Newby Narrows	2017	2018	2019	2020	2022
	Methow River Big Valley	2017	2018	2019	2020	2022
Wenatchee	YN Sunnyslope (ELJs)	2013	2014	2015	2016	2018
	Nason LWP Project (1st Bend)	2013	2014	2015	2016	2018
	Nason UWP Reach 3 & 4	2015	2016	2017	2018	2020
	Nason LWP Groups 2 & 3	2016	2017	2018	2019	2021
	Natapoc Project	2015	2016	2017	2018	2020
	Peshastin RM 0.8 Project	2013	2014	2015	2016	2018
	Meacham Flats	2017	2018	2019	2020	2022

## Summary of Monitoring Findings During the Reporting Period

For most completed project sites no action triggers were identified through post implementation monitoring during the reporting period. The spring runoff in each project subbasin in 2018 proved to be higher than usual, in some cases exceeding a 50 year event (Chewuch River). Most sites saw the highest spring discharges yet since their implementation.

One site that was flagged for observation in 2016 and 2017 was the a large channel spanning log structure that formed across the Chewuch River at the entrance to the Chewuch River Right side channel which was constructed in 2015. In 2017, high flows caused the channel spanning structure to break apart and now, as of 2018, there is no longer accumulated wood at the side channel inlet apart from the original engineered structure in this section of the Chewuch River.

Upstream of the Chewuch River Right side channel, at rivermile 16, the Site B large wood structures that were installed to help direct flows into a restored side channel on USFS lands caught newly recruited trees that fell into the river from upstream locations during the 2018 floods. These trees caught additional floating flood debris in 2018 and induced a high amount of bed scour at the base of the side channel inlet log structure. This scour, in turn, decreased the piling embeddedness of the log structure and caused sediment deposition in the lee of the wood structure which caused the main river channel to flow only down the reconnected side channel system at low flow, essentially dewatering the main river channel for 0.5 miles. USFS and YN determined that the new low flow hydrology was not detrimental to fish habitat, but this situation will be watched closely in the following years. Additionally, during construction of the 2018 components of the greater two year rivermile 15.5 to 20 project, YN contractors removed the reconfigured the alignment of the largest snagged trees against the Site B large wood structures to reduce recreation risks at the site. This mitigating action was taken in coordination with USFS staff due to concerns about latent recreational safety risks associated with the largest snagged trees.

Also, at the 1890s Side Channel along the Methow River near the town of Twisp, a second year of high spring flows caused additional prolonged surface water from the Methow River to pass under the WSDOT Highway 20 bridge at the head end of the channel, bringing a large current of water down the historic channel alignment and into the constructed channel area starting at the pipe outlet location at station 41+00. The boulder carpet placed around the pipe outlet and around the head end of the constructed channel once again successfully held the post project grade and prevented a significant head cut from forming in the upper channel bed. However some additional smaller diameter gravels and silt did mobilize during the peak flow event, which deposited into the pipe outlet zone. As in 2017, performance of the infiltration gallery was not affected by the cobble/gravel deposits near the pipe outlet because the gallery invert is still well above the elevation of the deposited bed load. However, in fall of 2018, based upon the engineer's recommendations and requests from the landowners, YN Fisheries staff hand shoveled the deposited sediments out of the pipe outlet area and constructed a small rock gabion above the pipe outlet to catch additional sediments in future years.

## *Lessons Learned*

Two thousand eighteen continued the previous year's high level of success in implementing large restoration project for the YN UCHRP. Once again we accomplished major restoration actions in each of the three project subbasins, and in the Methow Subbasin we conducted simultaneous work in three major river systems (Chewuch, Twisp, and Beaver Creek). Within these projects we continue to employ emerging and innovative restoration techniques focused on enhancing the effectiveness of the habitat improvements, decreasing disturbance impacts to adjacent non-target environments, and/or increasing the efficiency of the restoration work to decrease project costs or increase the speed at which projects can be completed. Below are some of the lessons we learned in the 2018 reporting period based on our innovative approaches to restoration:

- On the Chewuch River in 2018 we installed multiple bank buried log structures without significant coffering by only excavating to the water's edge during the instream work window and then placing logs in the river without additional excavation. The backfill upon the logs on the streambank was done slowly and deliberately so as to no spill sediment into the river channel. This technique increase the speed of wood structure installation significantly, and allowed structures to be built without requiring construction water pumping which is costly and can cause accidental turbidity releases. This technique works well in places where water existing pools already provide water depth below the new structure, or modeled stream velocities indicate that the new wood placements will induce bed scour during high flows in future flood events.
- Once again, looking at the effect of sediment deposition caused by the 2018 high spring runoff in side channel systems we had constructed in previous years, it was apparent that the design objective of increasing sediment scour at low flow stages in alcove systems using an infiltration gallery was a great success.
- Before the 2018 high water event we spent a concentrated amount of time removing browse protection infrastructure from previous restoration sites so that flood waters and debris would not destroy or deposit on vegetation fencing or cages. This effort proved to be very useful in defraying unintended consequences such as causing debris buildups, increasing vegetation mortality, and/or losing expensive browse protection materials due to flooding. After the flood events we replaced browse protection materials to continue protecting our newly planted vegetation.

**Yakama Nation**

**Upper Columbia Habitat Restoration Project**

**ANNUAL REPORT**

*Report covers work performed under BPA Project #2009-003-00  
Master Agreement #56662 - Releases 111, 142, 161, and 169*

*Report was completed under BPA Project #2009-003-00  
Master Agreement #56662 - Release 161*

REPORT COVERS WORK FROM JANUARY 1<sup>ST</sup>, 2018 THROUGH DECEMBER 31<sup>ST</sup>, 2018

**Attachment 1 – Completed Projects As-Builts**

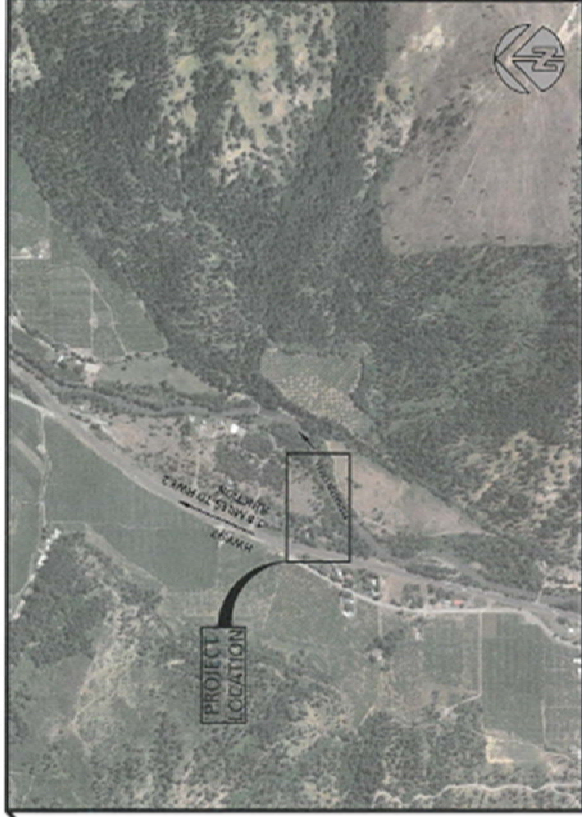
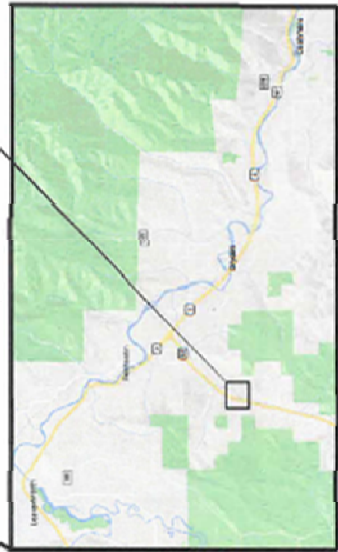
- **Peshastin RM 2.7 Project (Wenatchee Subbasin)**
- **Twisp River Horseshoe Side Channel Phase 1 Project (Methow Subbasin)**
- **Chewuch River Mile 15.5 to 17 (Methow Subbasin)**
- **Tillicum Fan Project (Entiat Subbasin)**
- **Beaver Creek RM 2.6 (DOT) Project (Methow Subbasin)**



# PESHASTIN CREEK, RIVER MILE 2.7

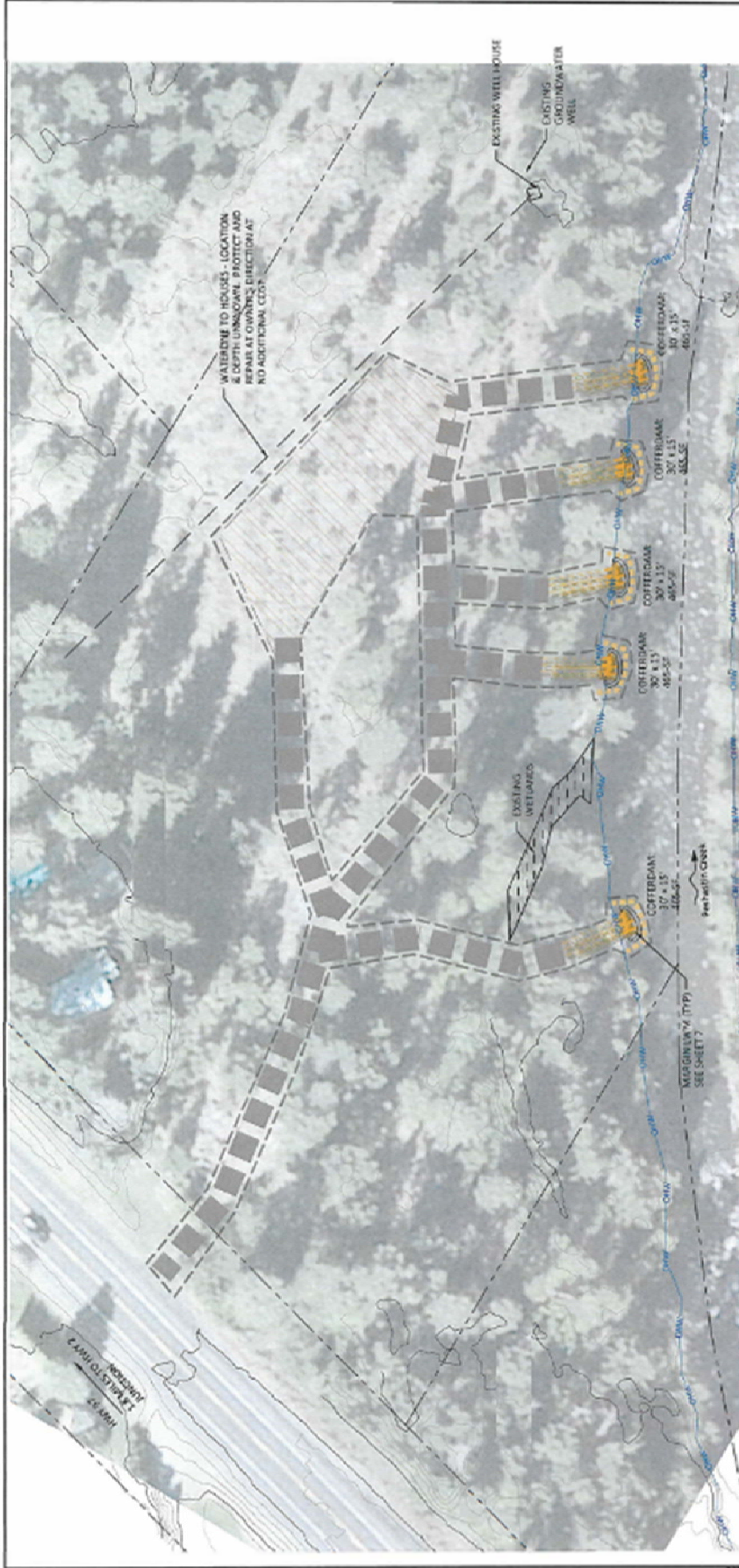
## As-Built Plans

CHELAN COUNTY, WASHINGTON  
2018



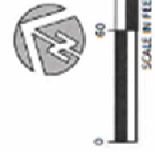
LOCATION:  
LATITUDE 47.53993°N  
LONGITUDE 120.61694°W  
SECTION 29, TOWNSHIP 29N, RANGE 21E  
CHELAN COUNTY  
WATERBODY: PESHASTIN CREEK  
TRIBUTARY OF: WENATCHEE RIVER

NO. 10		DATE		BY		CHECKED		SCALE		SHEET	
										1 OF 2	
Confederated Tribes and Bands of Yakama Nation Peshastin Creek RM 2.7 Habitat Enhancement Project									502 Park Avenue, Suite 201 Portland, OR 97205 Tel: 503.933.8000 www.interfluvio.com		
COVER, VICINITY AND INDEX											



**LEGEND**

- EXISTING CONTOURS (1 AND 5 FT)
- - - TAIL OF BOUNDARY
- ORDINARY HIGH WATER (OHW)
- CONFEDERATE DAM (SHEET 4)
- SET FENCE (SHEET 4)
- ..... LIMITS OF DISTURBANCE
- STAGING AREA
- ACCESS



DM 30000 DM 30000E DM 30000E DM 30000E		DM 30000E DM 30000E DM 30000E DM 30000E	LH LH LH LH	170254 170254 170254 170254	08/20/2018 08/20/2018 08/20/2018 08/20/2018	6 OF 12 SHEET
INTERFLINE 555 SE Pine Avenue Suite 80 Hood River, OR 97113 503.385.6888 www.interflin.com		Confederate Tribes And Bands Of Yakama Nation Peshastin Creek RM 2.7 Habitat Enhancement Project				

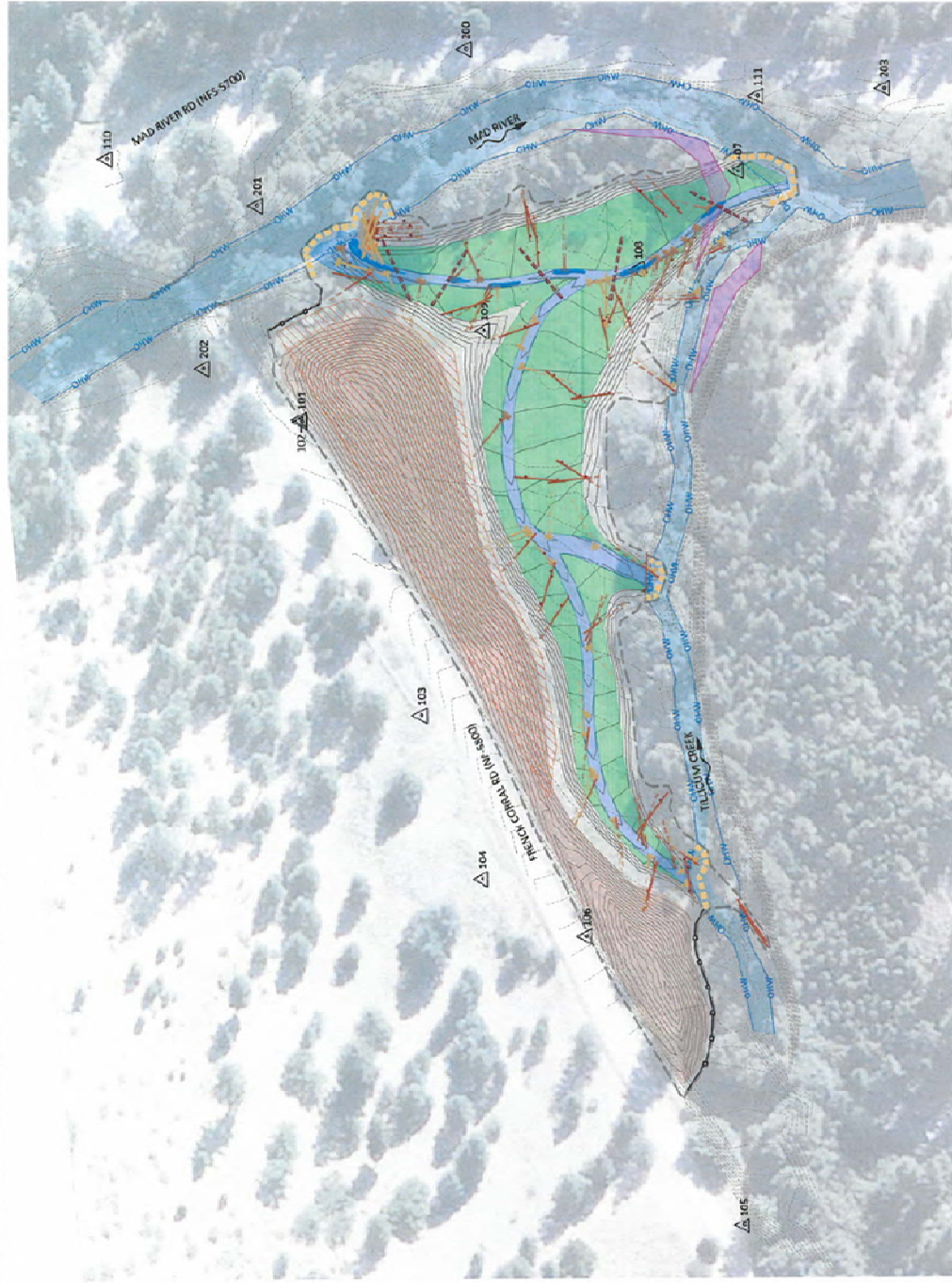




SCALE IN FEET  
0 80 160

**LEGEND**

- CONTOURS (1 FT)
- ORDINARY HIGH WATER
- WETLAND DELINEATION
- CHANNEL
- FLOODPLAIN
- SPOILS PLACEMENT
- BERM
- LIMITS OF DISTURBANCE
- LWM PLACEMENT



501 Parkway Avenue, Suite 802  
Hood River, OR 97031  
Phone: 541.346.5003  
www.interfluvio.com



**CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION  
MAD RIVER NEAR ARDENVIOIR, WASHINGTON  
TILLICUM FAN HABITAT RESTORATION PROJECT**

DATE	DATE	BY
APPROVED	3/15/2018	32-02-51
SALE		PROJECT

NO.	REV.	DATE	REVISION DESCRIPTION

# TWISP RIVER, HORSESHOE BEND SIDE CHANNEL PROJECT

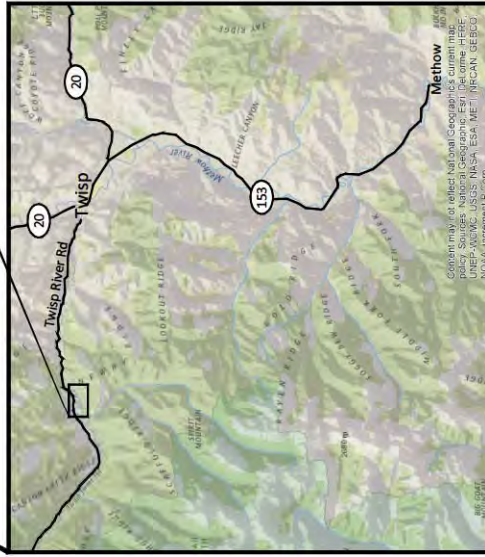
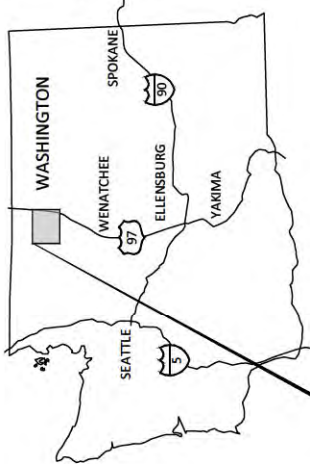
## As Built Plans



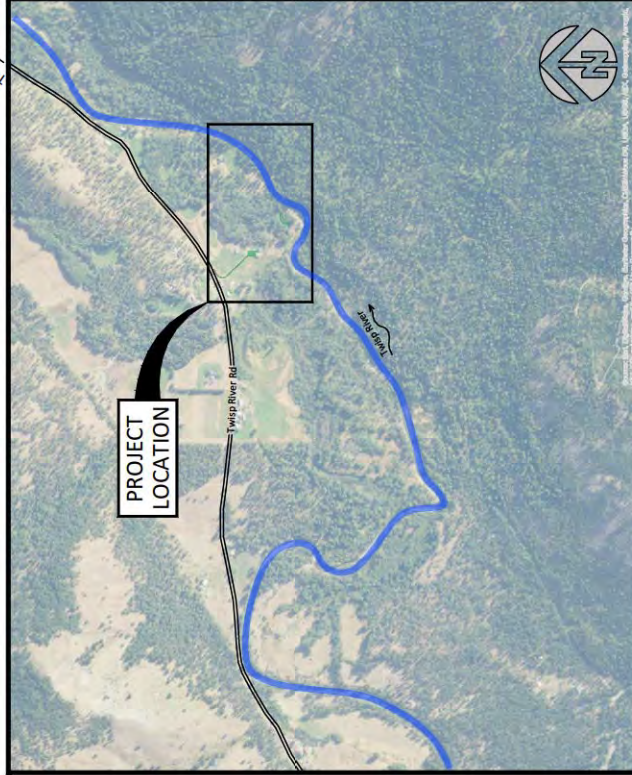
YAKIMA NATION FISHERIES  
2 JOHNSON LANE  
WINTHROP WA, 98662

### SHEET LIST

- 1 Cover, Sheet List and Location Maps
- 2 Proposed Conditions, Staging, Access and Sheet Index
- 3 Side Channel Plan and Profile
- 4 Riverbank Log Structure



VICINITY MAP  
SCALE: 1" = 4 MILES



SITE MAP  
SCALE: 1" = 1/4 MILE

COORDINATES: N 48.369176°  
LATITUDE W 120.307181°  
LONGITUDE  
SECTION 11, TOWNSHIP 33N, RANGE 20E  
WATERBODY: TWISP RIVER  
TRIBUTARY OF: METHOW RIVER

NO.	BY	DATE	REVISION DESCRIPTION

DF	LH	LH	LH
DRAWN	DESIGNED	CHECKED	PROJECT
MM	MM	MM	MM
12/31/18	12/31/18	15-02-23	15-02-23
APPROVED	DATE	DATE	PROJECT

TWISP RIVER HORSESHOE BEND  
SIDE CHANNEL PROJECT  
TWISP, WASHINGTON



501 Portway Avenue, Suite 101  
Hood River, OR 97101  
541.366.3003  
www.interfluvio.com

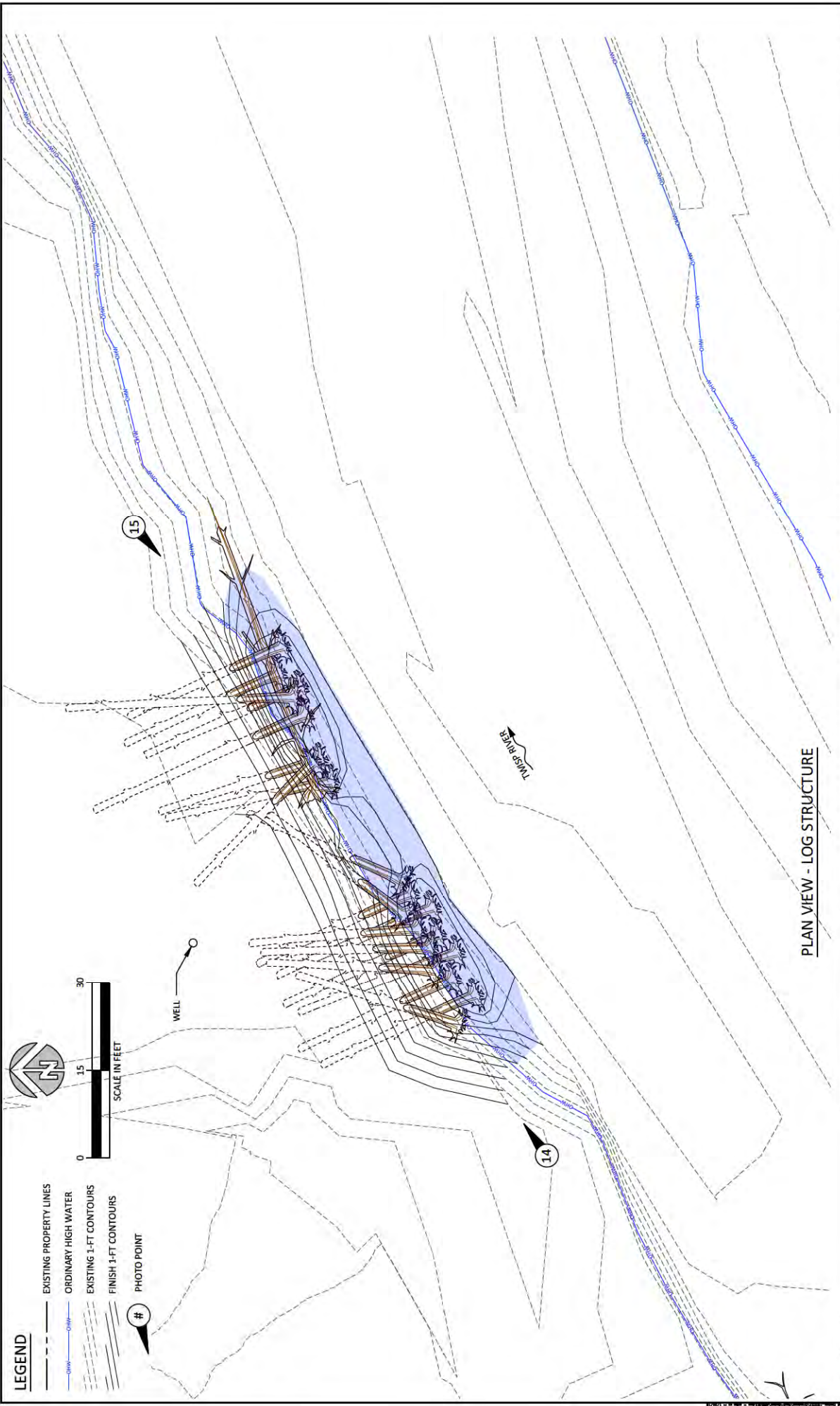
COVER, SHEET LIST AND  
LOCATION MAPS

SHEET

1 of 4







**LEGEND**

- EXISTING PROPERTY LINES
- ORDINARY HIGH WATER
- EXISTING 1-FT CONTOURS
- FINISH 1-FT CONTOURS
- # PHOTO POINT



PLAN VIEW - LOG STRUCTURE

NO.	DATE	REVISION DESCRIPTION

DF	LH/MM	LH/MM
DRAWN	DESIGNED	CHECKED
MM	MM	MM
APPROVED	DATE	DATE
	12/31/18	15-02-23
		PROJECT

TWISP RIVER HORSESHOE BEND  
SIDE CHANNEL PROJECT  
TWISP, WASHINGTON



501 Portway Avenue, Suite 101  
Twisp, WA 98911  
541.286.3003  
www.interfluvio.com

RIVERBANK LOG STRUCTURE

SHEET  
4 of 4

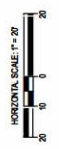
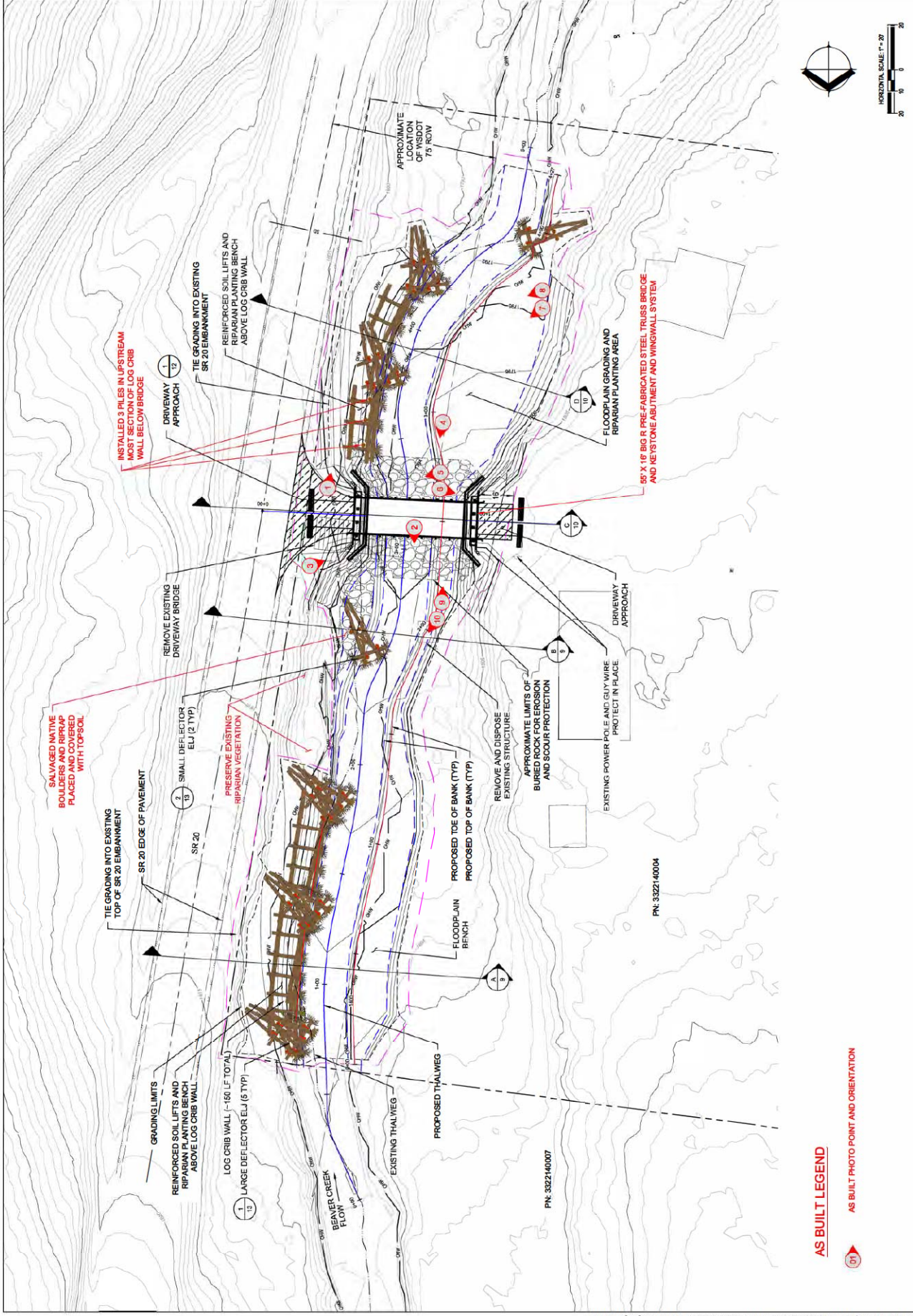




DATE	DESCRIPTION
REVISED ON 07/18/2016	

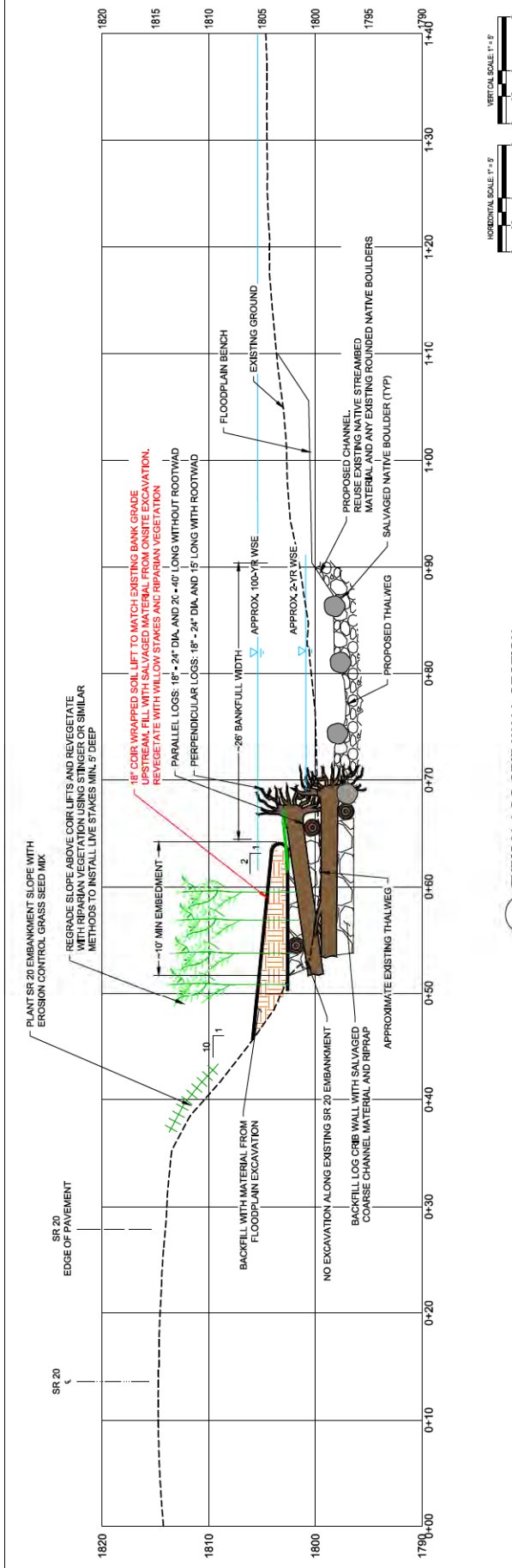


DATE	1 JULY 2008
DRAWN	J.B.
DESIGNED	J.B.
CHECKED	J.B.M.
PROJECT #	18759280
SHEET TITLE	AS BUILT SITE PLAN
SHEET NUMBER	7

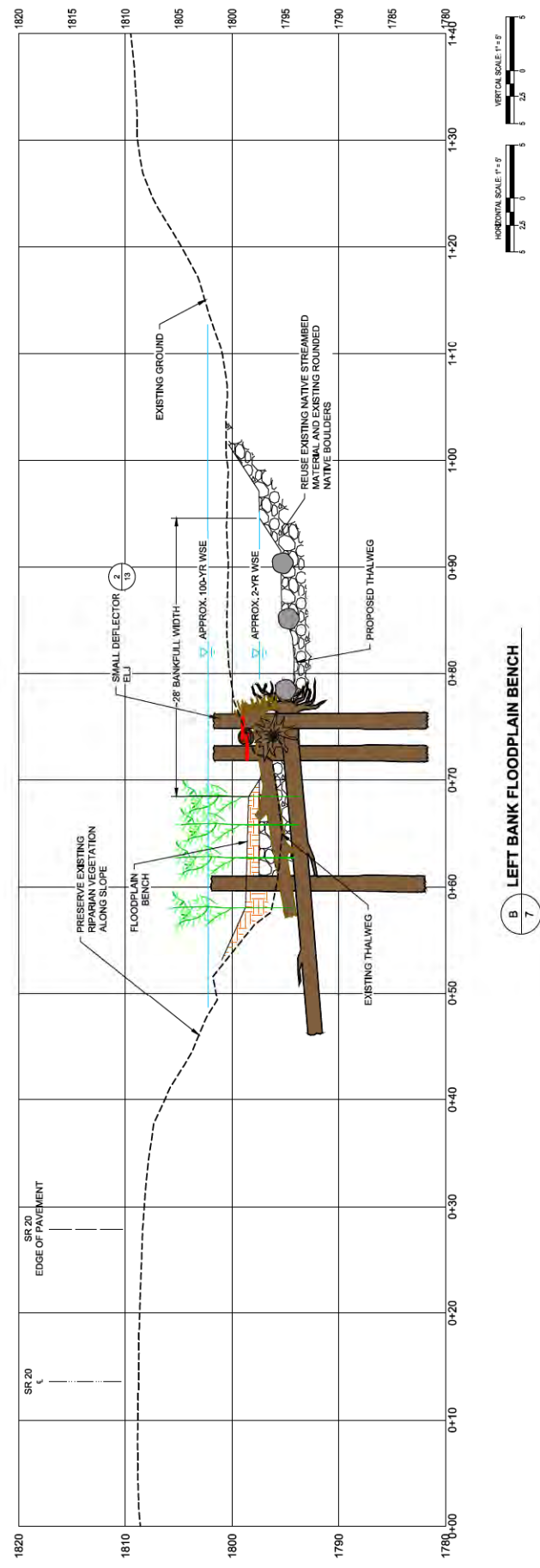


**AS BUILT LEGEND**  
 AS BUILT PHOTO POINT AND ORIENTATION

DATE	DESCRIPTION



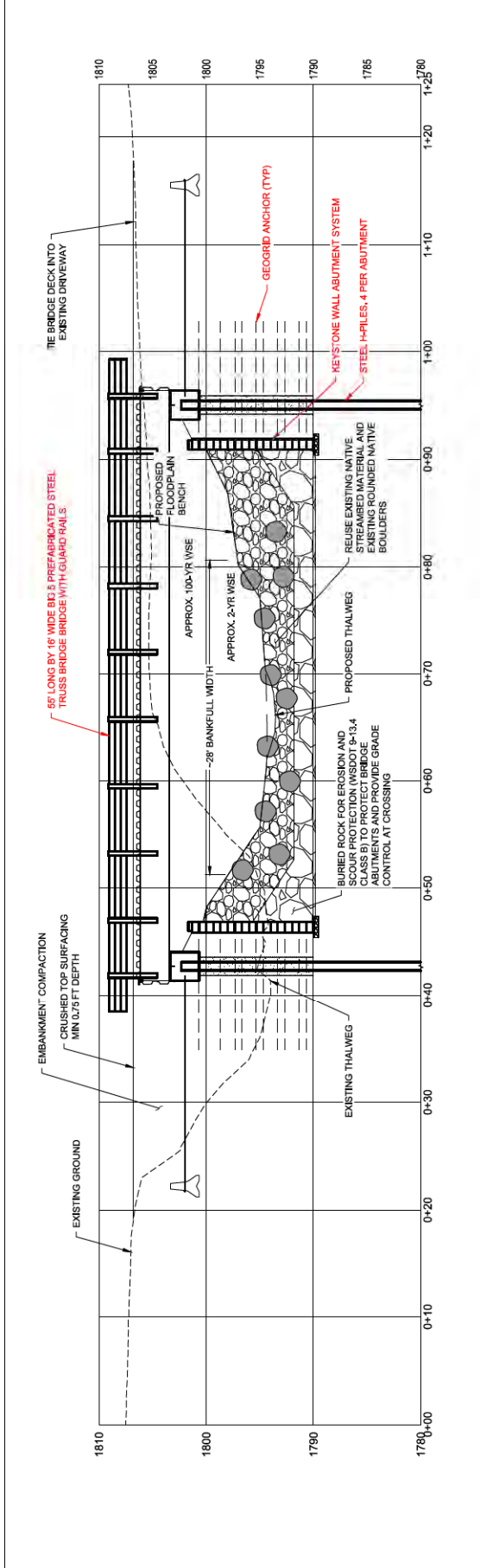
A TYPICAL LOG CRIB WALL SECTION



B LEFT BANK FLOODPLAIN BENCH

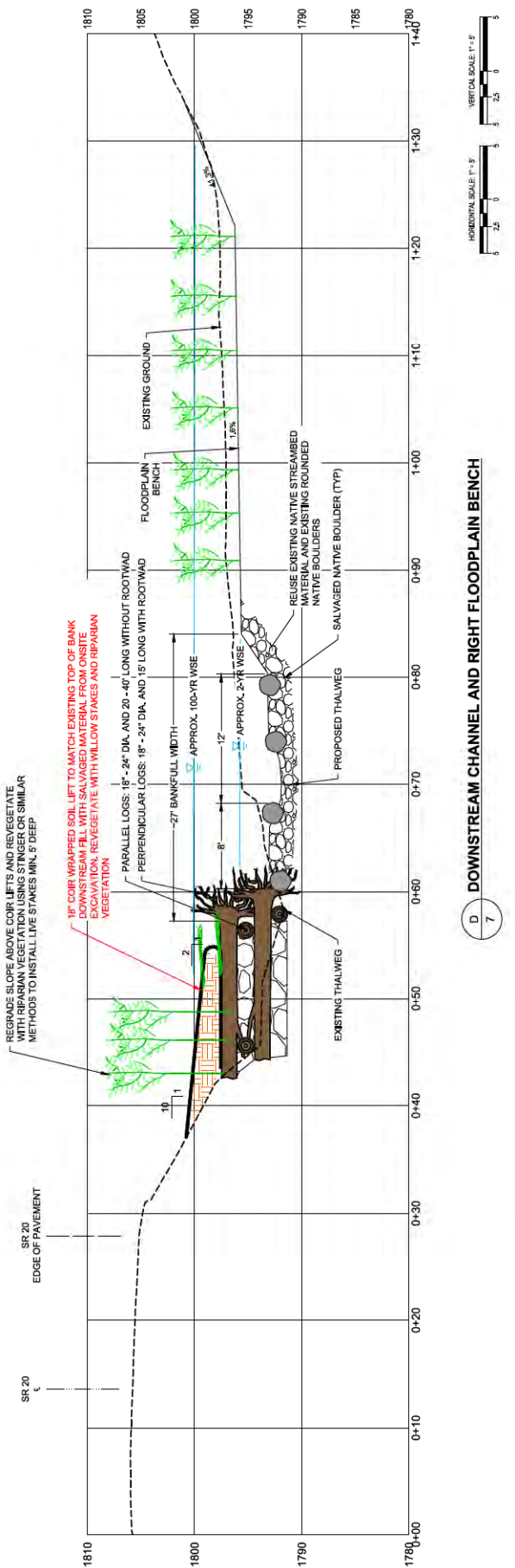
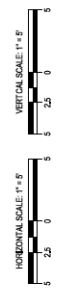


NO.	DATE	DESCRIPTION

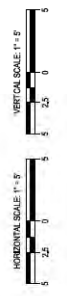


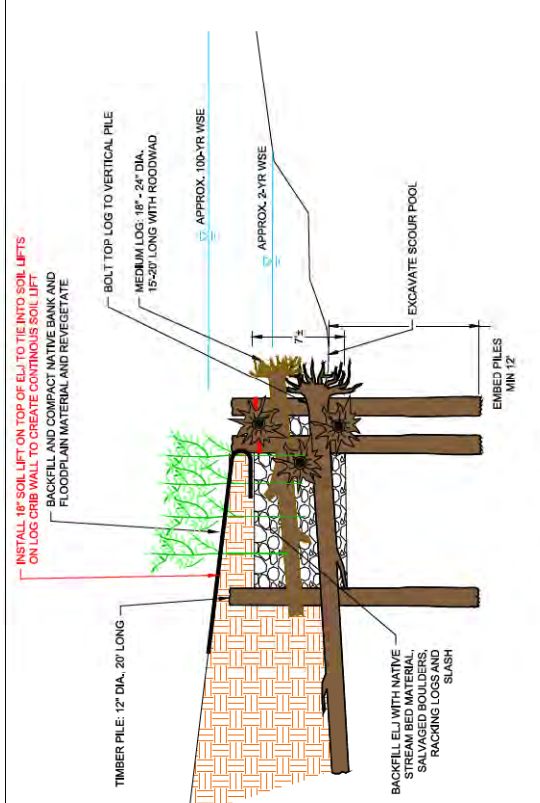
**C TYPICAL BRIDGE SECTION**

**NOTE:**  
 BRIDGE SHOWN IN SECTION C IS A REPRESENTATIVE SCHEMATIC. FOR ADDITIONAL DETAILS ON BRIDGE DESIGN REFER TO FINAL BRIDGE DRAWINGS PROVIDED BY OTAK DATED 09-20-2018 AND BIG R BRIDGE DATED 08-28-2018.



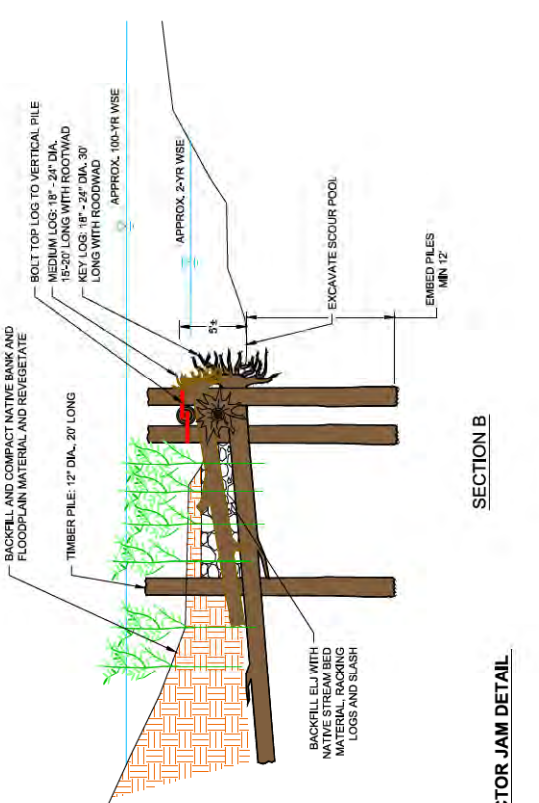
**D DOWNSTREAM CHANNEL AND RIGHT FLOODPLAIN BENCH**





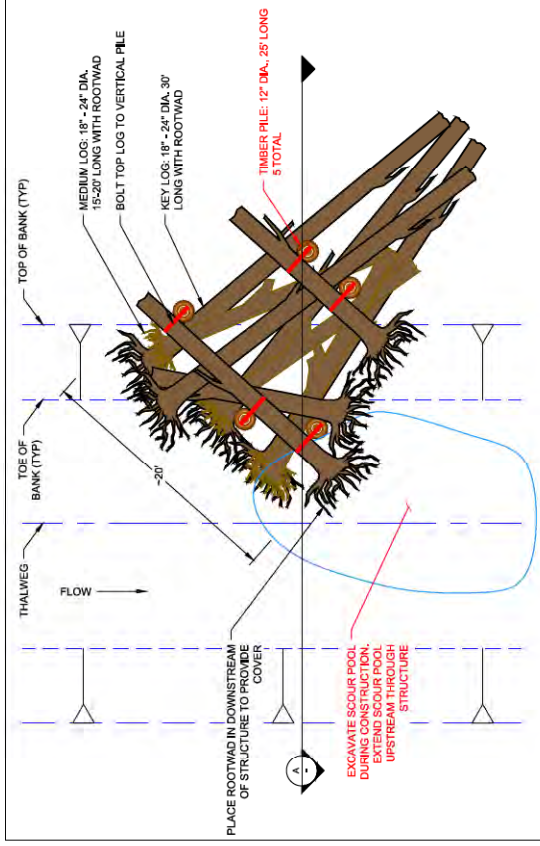
SECTION A

1 TYPICAL LARGE DEFLECTOR JAM DETAIL  
 NOT TO SCALE

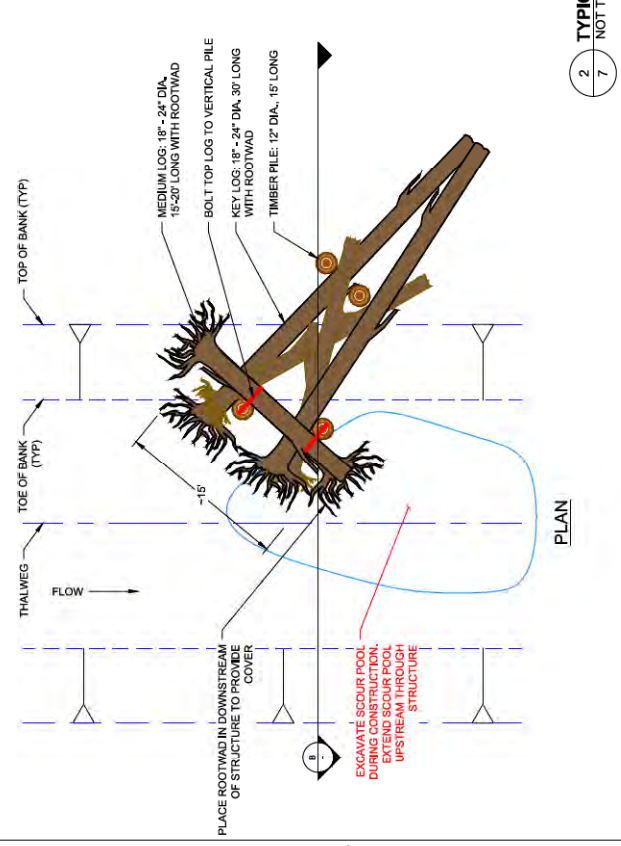


SECTION B

2 TYPICAL SMALL DEFLECTOR JAM DETAIL  
 NOT TO SCALE



PLAN



PLAN

# CHEWUCH RIVER MILE 17-20

## FISH HABITAT ENHANCEMENT PROJECT

AsBuilt



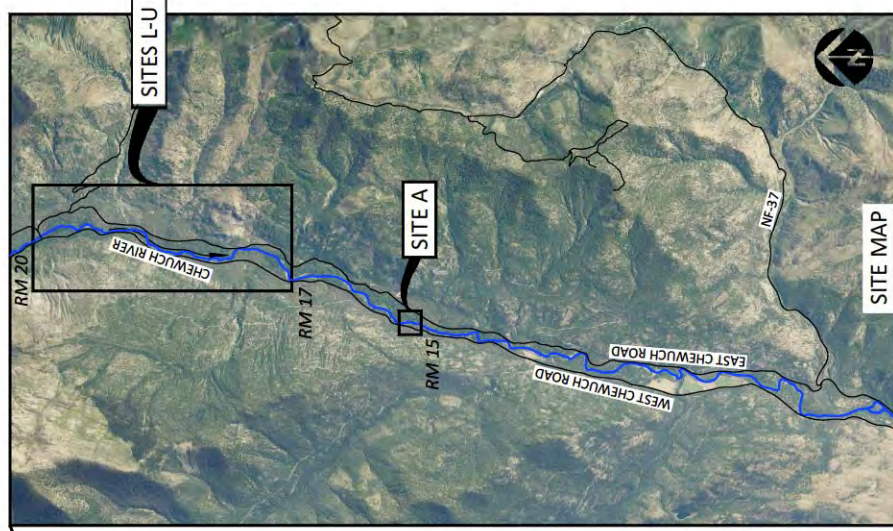
YAKAMA NATION FISHERIES  
2 JOHNSON LANE  
WINTHROP, WA, 98662

### SHEET LIST

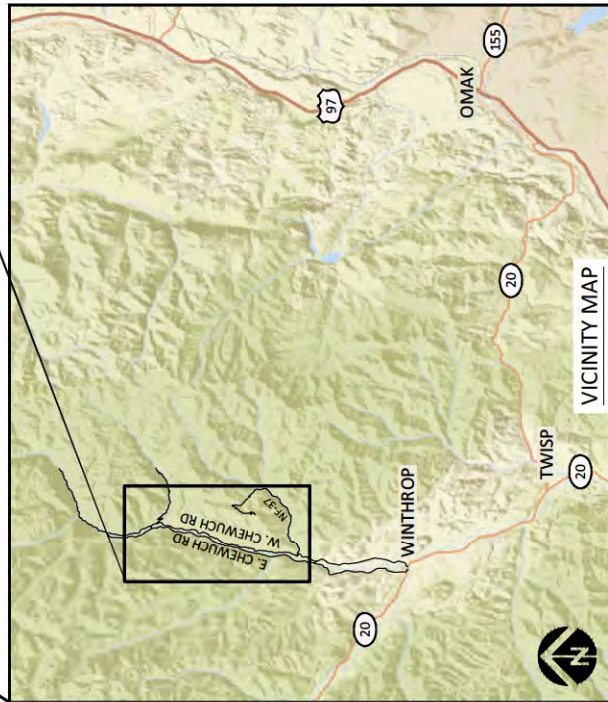
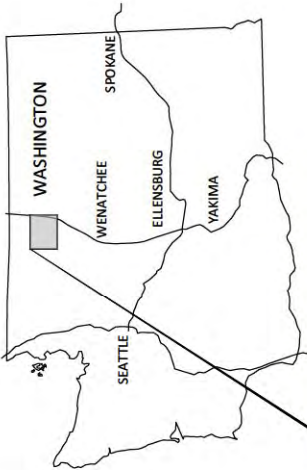
1. COVER SHEET, VICINITY MAPS, SHEET LIST
2. PROJECT SITES OVERVIEW
3. SITE A
4. SITE L
5. SITE M
6. SITE N
7. SITE O
8. SITE P
9. SITE Q
10. SITE S
11. SITE T
12. SITE U



EXPIRES 07-25-2018



WINTHROP, 11 MILES



### SITE LOCATION:

LATITUDE: 48°39'27"  
LONGITUDE: -120°08'30"  
OKANOGAN COUNTY, WASHINGTON  
WATERBODY: CHEWUCH RIVER  
TRIBUTARY OF: METHOW RIVER

501 Portway Avenue, Suite 101  
Renton, WA 98051  
541.386.3003  
www.interfluvio.com



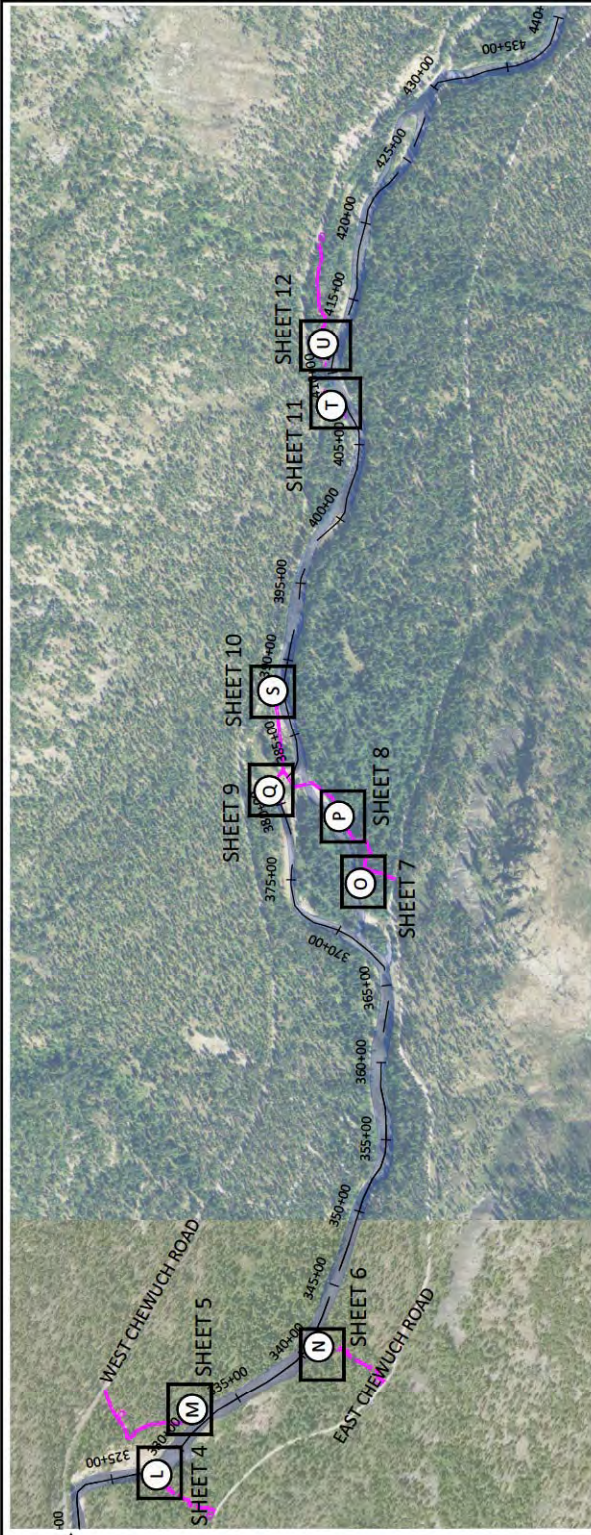
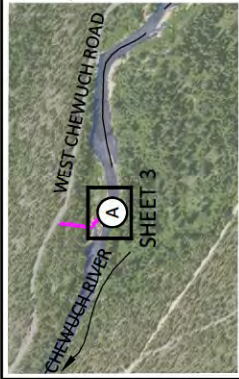
CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION  
CHEWUCH RIVER MILE 17-20  
FISH HABITAT ENHANCEMENT PROJECT

MM DRAWN	MM DESIGNED	MM CHECKED	MM PROJECT
MM APPROVED	DATE 12/31/18	DATE	PROJECT

NO.	BY	DATE	REVISION DESCRIPTION

COVER SHEET, VICINITY MAPS,  
SHEET LIST

SHEET  
1 OF 12



SITE OVERVIEW

LEGEND

- 245+00 --- MAIN CHANNEL ALIGNMENT
- TEMPORARY ACCESS



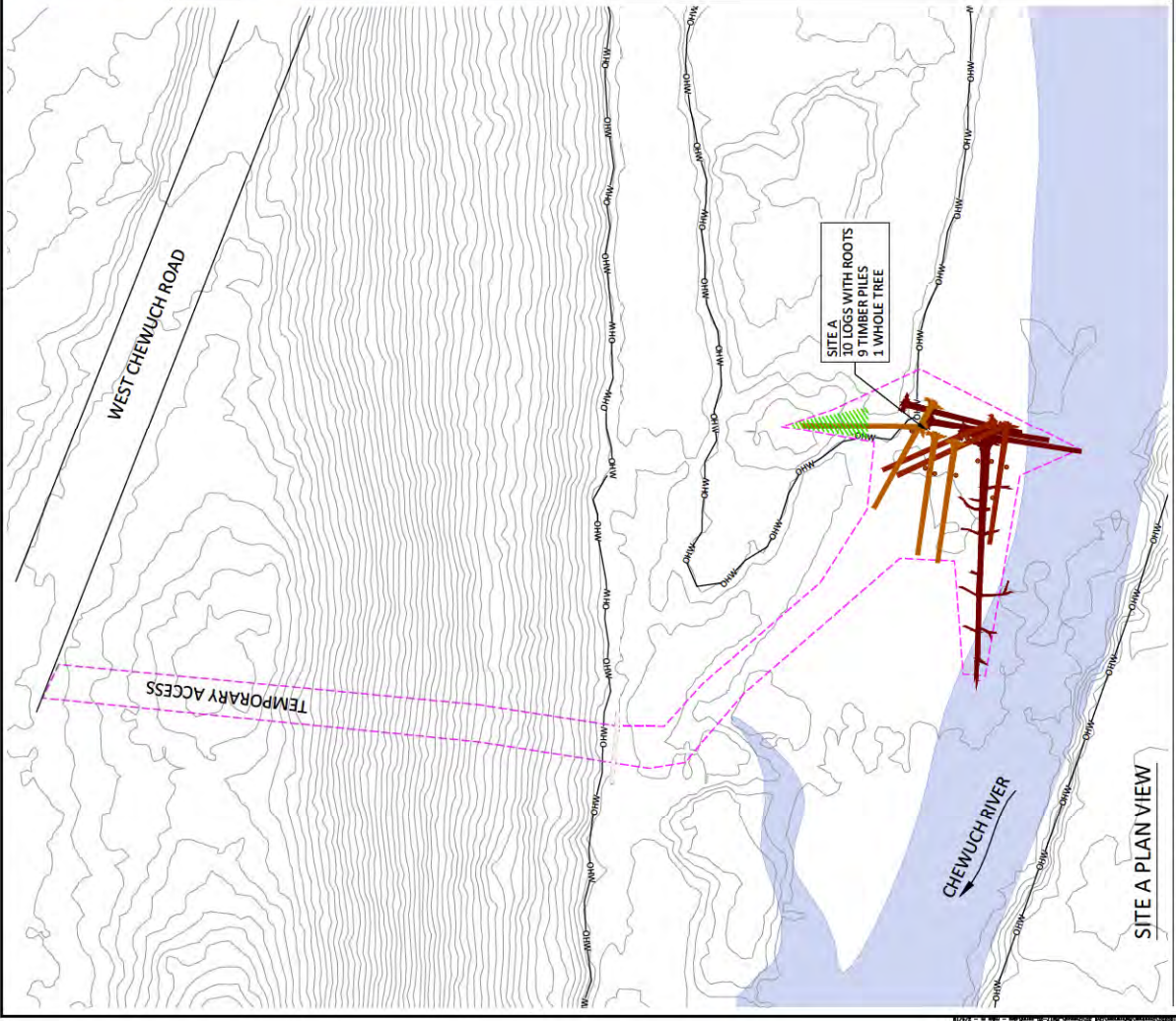
SCALE IN FEET

NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN	MM DESIGNED	MM CHECKED
MM APPROVED	12/31/18	PROJECT
	DATE	

CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION  
 CHEWUCH RIVER MILE 17-20  
 FISH HABITAT ENHANCEMENT PROJECT





- LEGEND**
- ORDINARY HIGH WATER
  - TYPICAL LOW WATER LINE
  - LARGE WOODY MATERIAL

NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN	MM DESIGNED	MM CHECKED
MM APPROVED	12/21/18	PROJECT

CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION  
 CHEWUCH RIVER MILE 17-20  
 FISH HABITAT ENHANCEMENT PROJECT

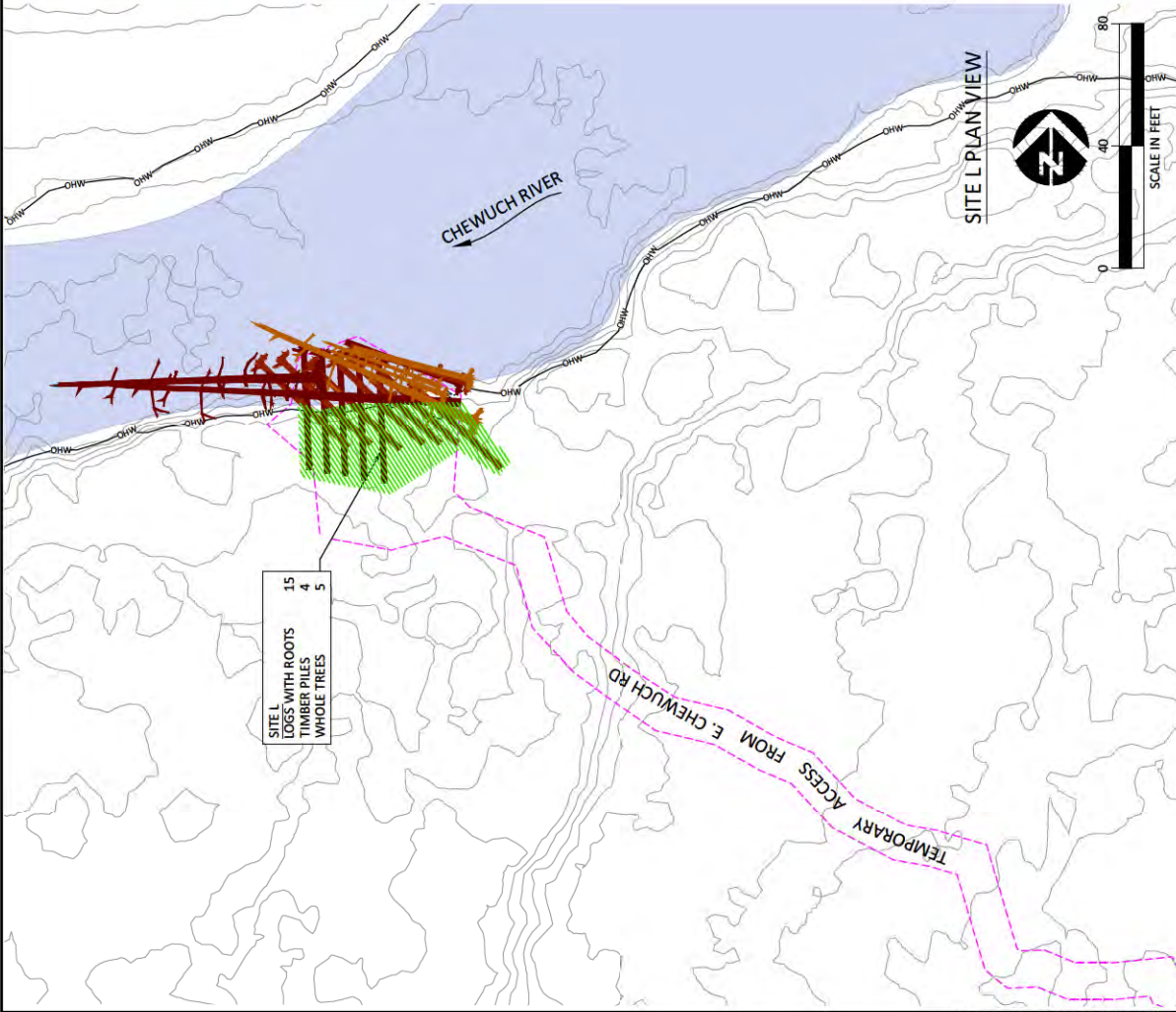
**interfluv**

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 Hood River, OR 97113  
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KEY MAP

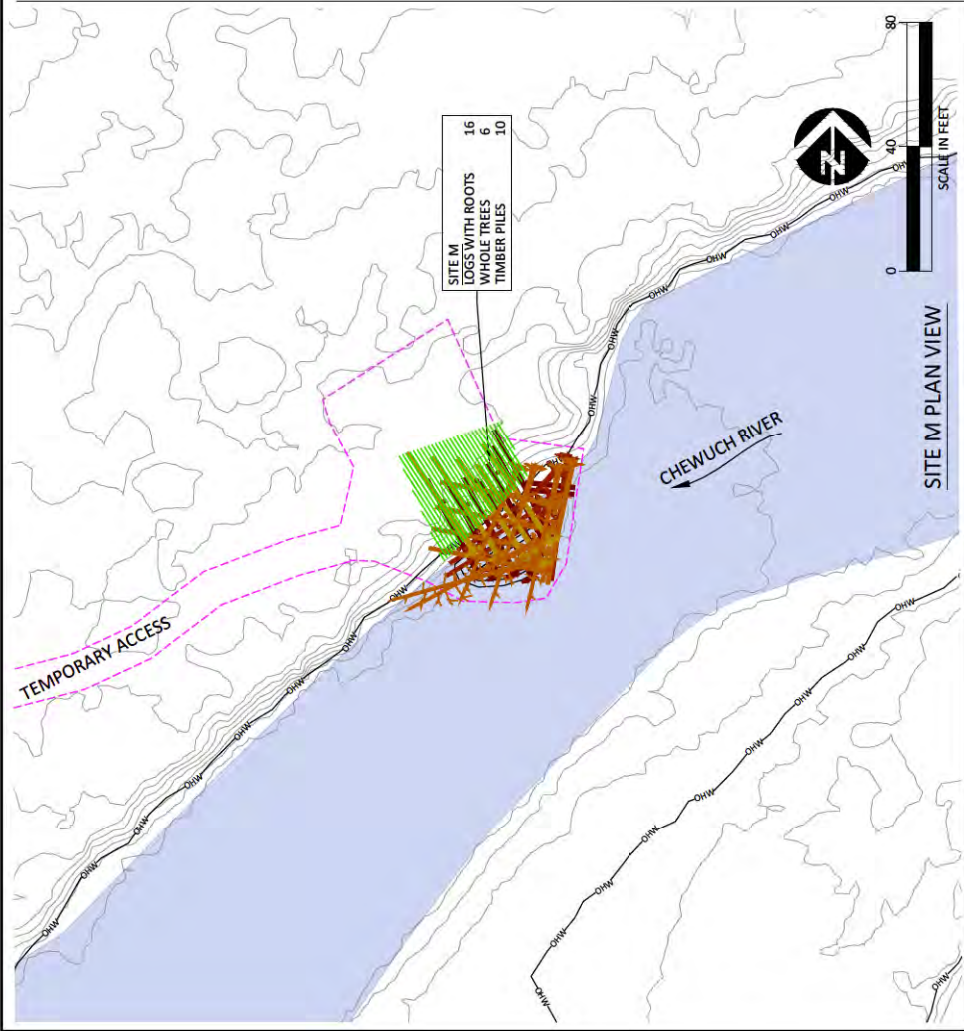


- 15 SITE L EDGES WITH ROOTS
- 4 TIMBER PILES
- 4 WHOLE TREES
- 5

- LEGEND**
- OHW ——— ORDINARY HIGH WATER
  - TYPICAL LOW WATER
  - - - - - LIMITS OF DISTURBANCE
  - LARGE WOODY MATERIAL
  - LWD BURIAL



<p>501 Portway Avenue, Suite 101          Redmond, OR 97751          541.386.3003  <a href="http://www.interfluv.com">www.interfluv.com</a></p>		<p>SITE L</p>	<p>SHEET 4 of 12</p>
<p>CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION          CHEWUCH RIVER MILE 17-20          FISH HABITAT ENHANCEMENT PROJECT</p>			
<p>MM DRAWN</p>	<p>MM DESIGNED</p>	<p>MM CHECKED</p>	<p>PROJECT</p>
<p>MM APPROVED</p>	<p>12/31/18</p>	<p>DATE</p>	<p>LOG STOCKPILE ADJACENT TO ROAD</p>



NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN	MM DESIGNED	MM CHECKED
MM APPROVED	12/31/18	DATE
PROJECT	PROJECT	PROJECT

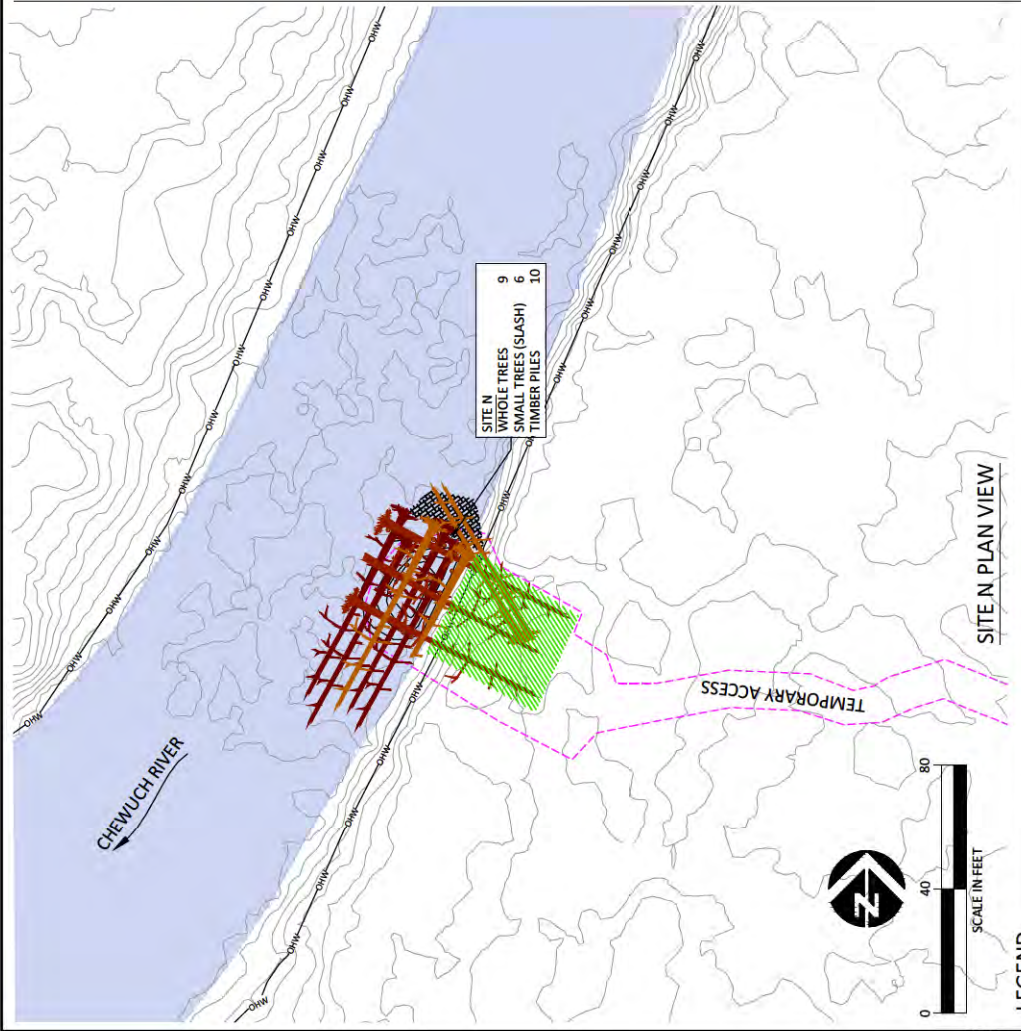
CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION  
CHEWUCH RIVER MILE 17-20  
FISH HABITAT ENHANCEMENT PROJECT

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Hood River, OR 97113  
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SITE M

SHEET 5 OF 12



- LEGEND**
- TYPICAL LOW WATER
  - ORDINARY HIGH WATER
  - LIMITS OF DISTURBANCE
  - LARGE WOODY MATERIAL
  - LWD BURIAL

NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN	MM DESIGNED	MM CHECKED
MM APPROVED	12/31/18	PROJECT
DATE		

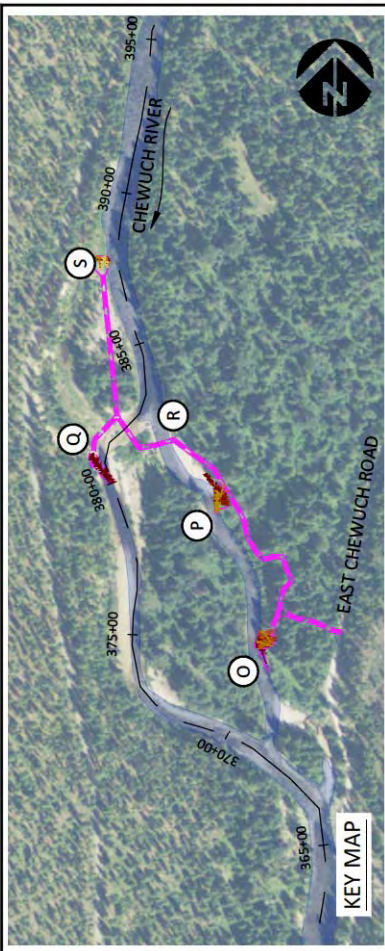
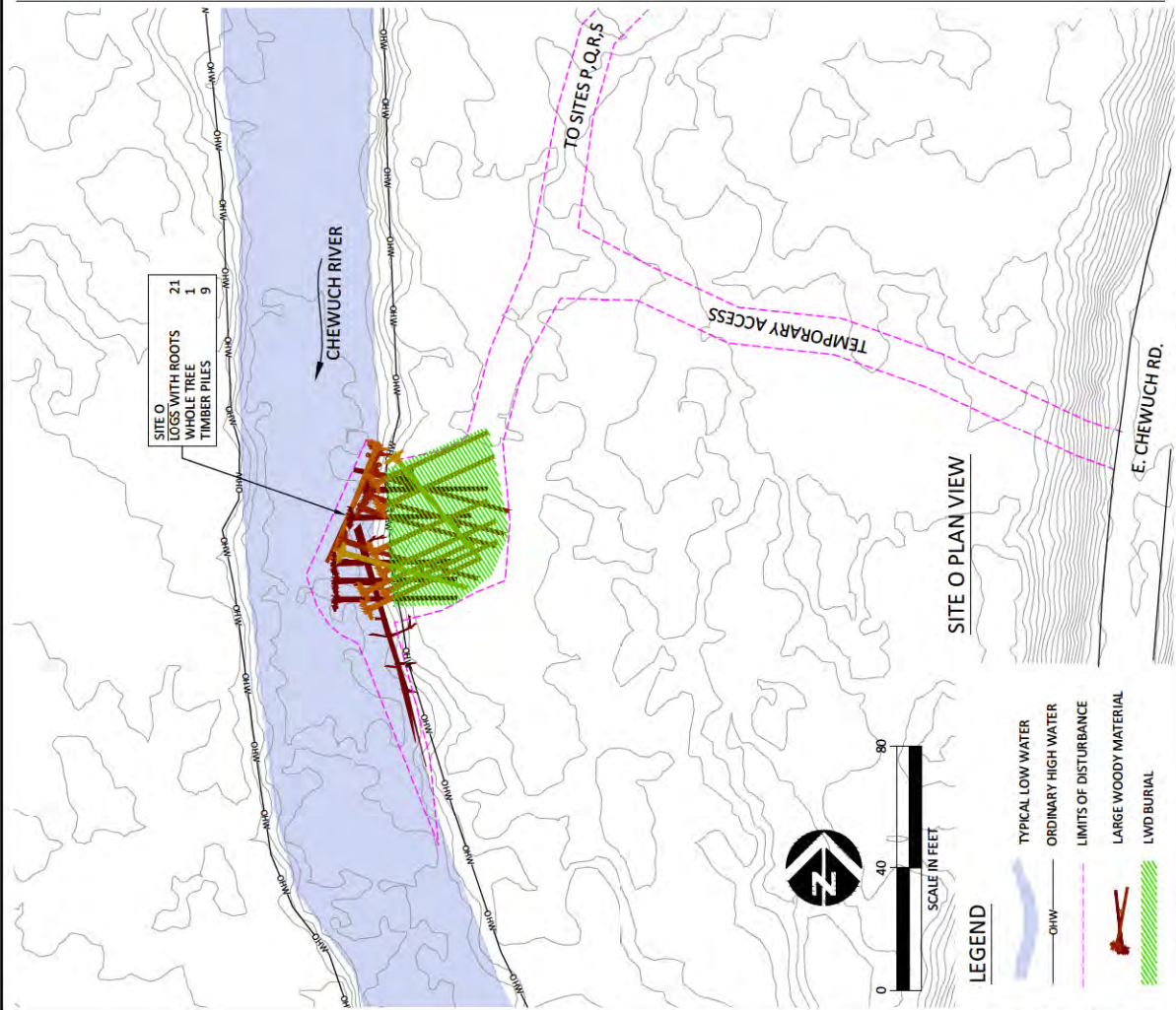
501 Portway Avenue, Suite 101  
 Hood River, OR 97031  
 541.386.3003  
 www.interfive.com

**interfive**

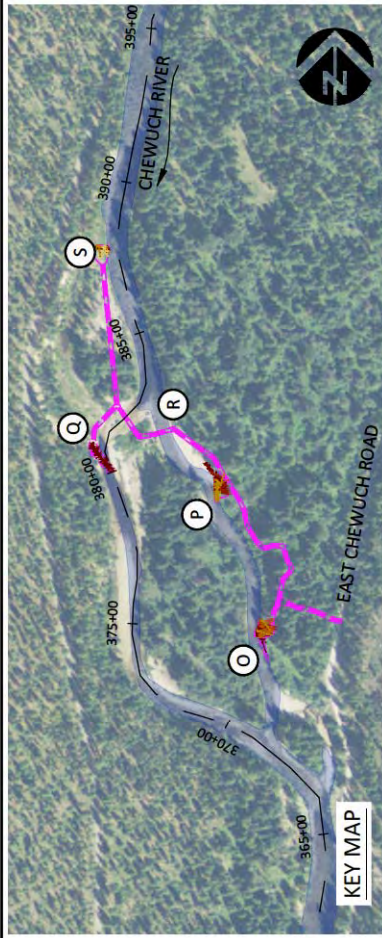
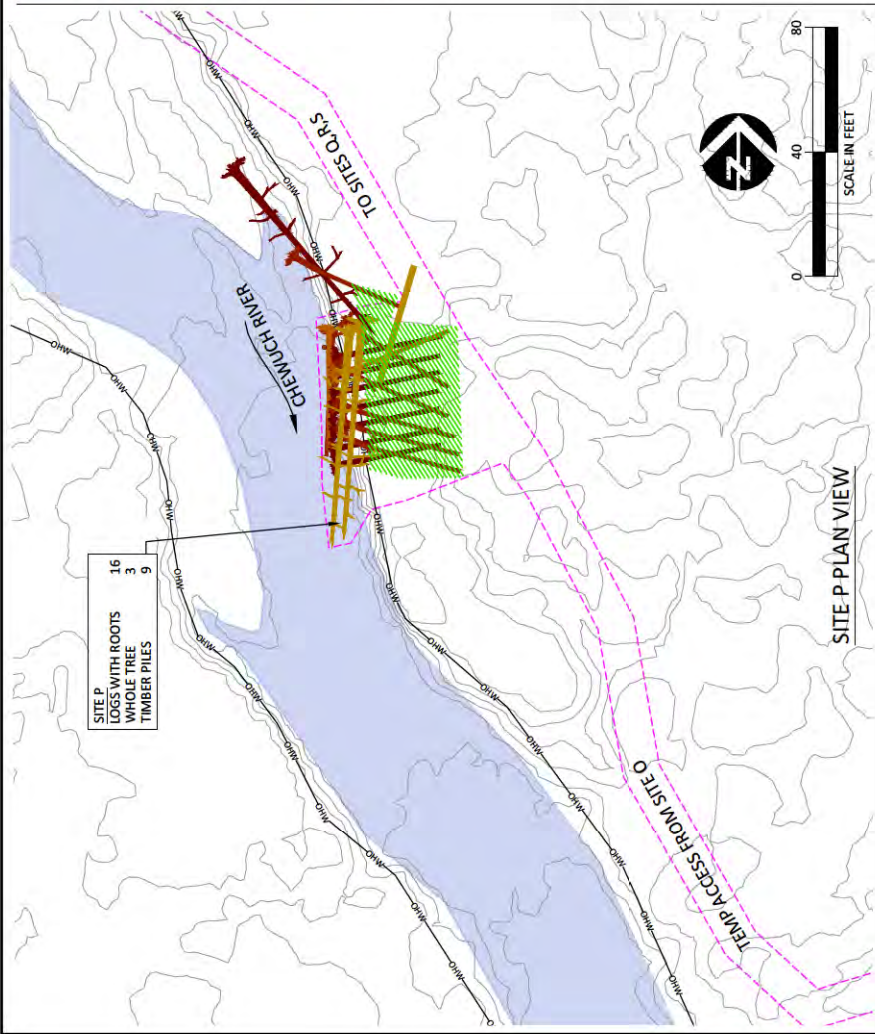
SITE N

SHEET 6 OF 12

CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION  
 CHEWUCH RIVER MILE 17-20  
 FISH HABITAT ENHANCEMENT PROJECT



SHEET		7 OF 12	
SITE O		CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION CHEWUCH RIVER MILE 17-20 FISH HABITAT ENHANCEMENT PROJECT	
		501 Portway Avenue, Suite 101 Redmond, OR 97751 541.386.3003 www.interfive.com	
MM DRAWN	MM DESIGNED	MM CHECKED	MM PROJECT
MM APPROVED	12/21/18	DATE	PROJECT



NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN	MM DESIGNED	MM CHECKED
MM APPROVED	12/21/18	PROJECT

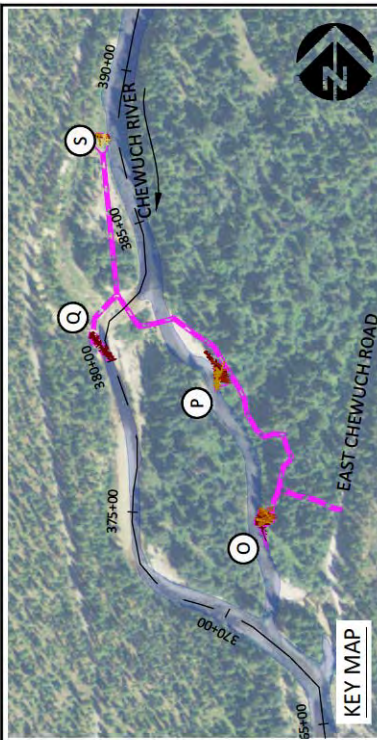
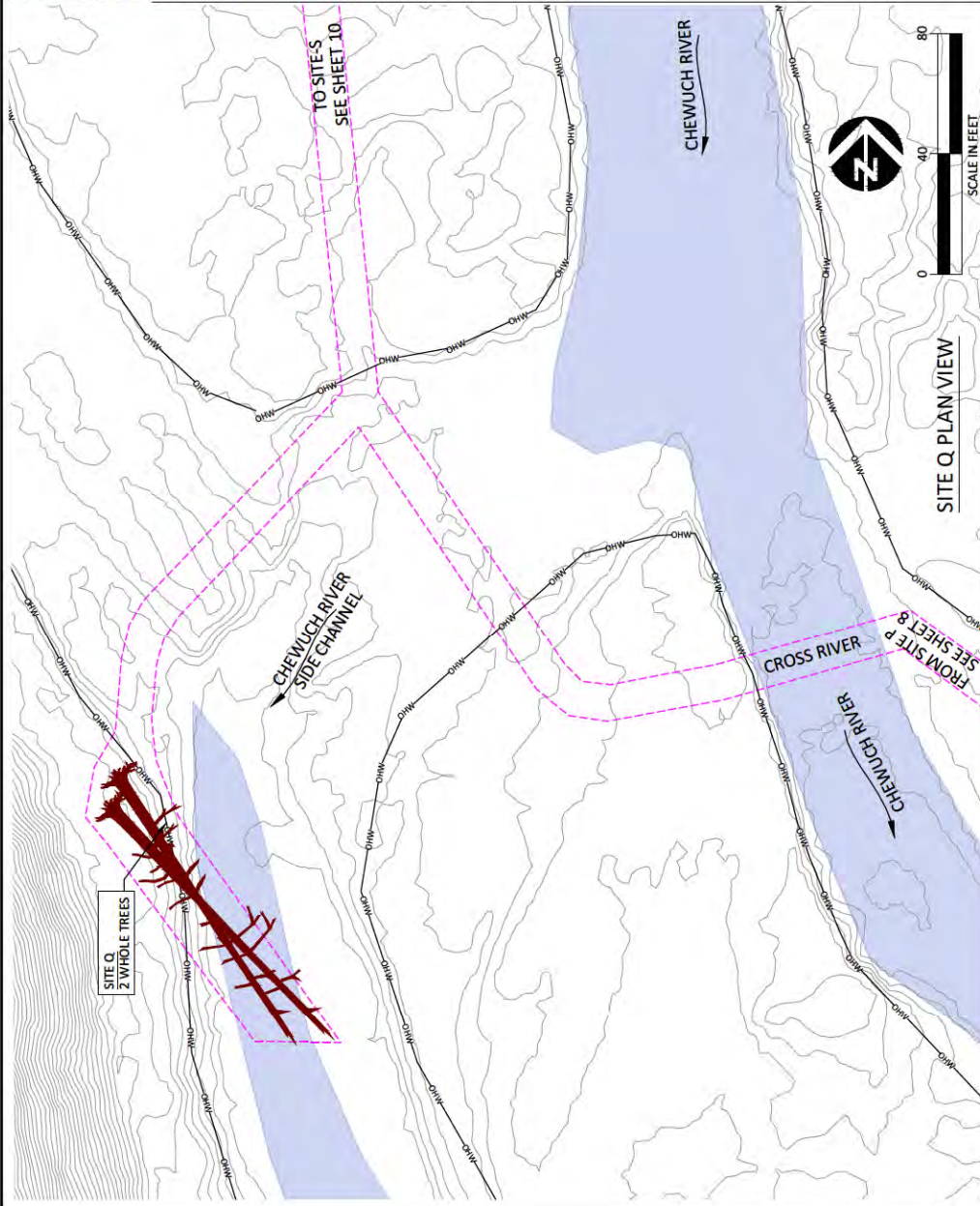
501 Portway Avenue, Suite 101  
 Hood River, OR 97113  
 541.386.3003  
 www.interfive.com

**interfive**

SITE P

SHEET 8 of 12

CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION  
 CHEWUCH RIVER MILE 17-20  
 FISH HABITAT ENHANCEMENT PROJECT



**LEGEND**

- TYPICAL LOW WATER
- ORDINARY HIGH WATER
- LIMITS OF DISTURBANCE
- LARGE WOODY MATERIAL

NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN	MM DESIGNED	MM CHECKED
MM APPROVED	12/31/18	DATE
PROJECT	PROJECT	PROJECT

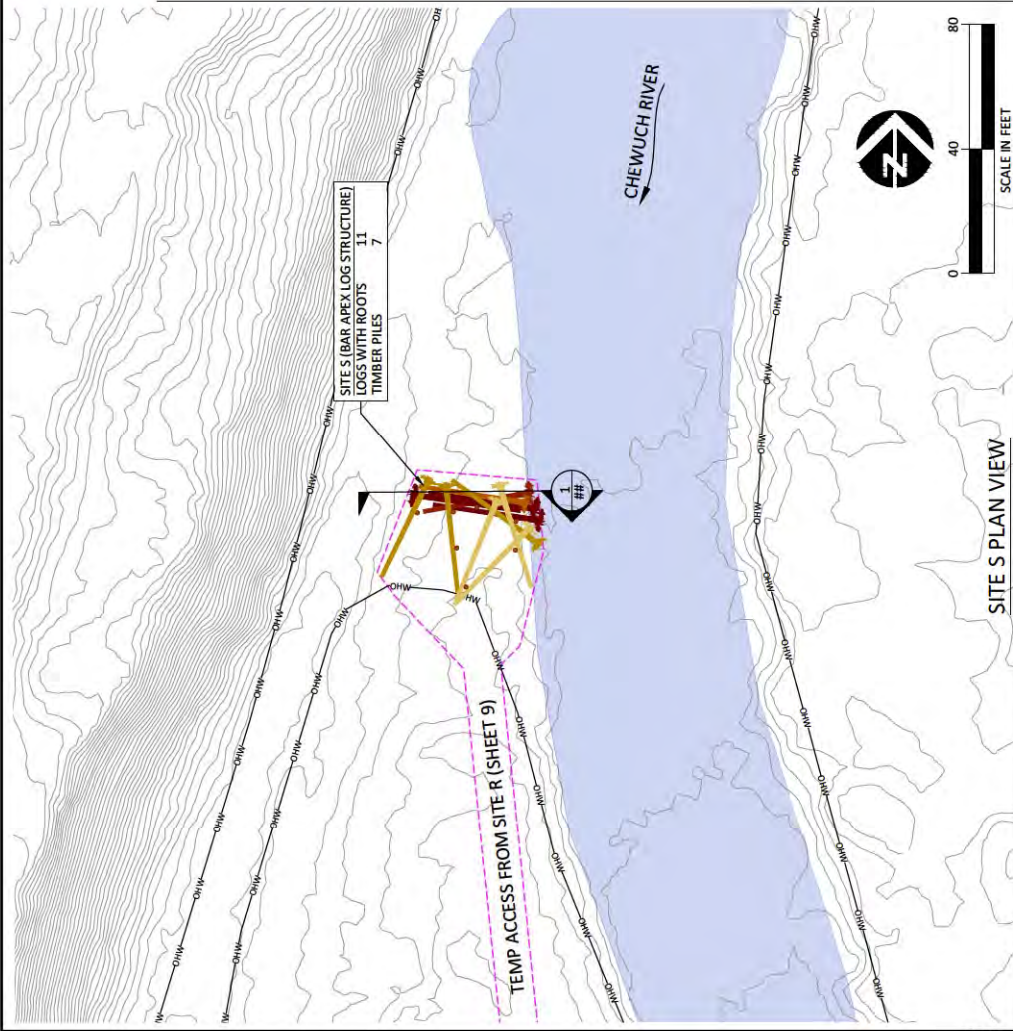
**CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION  
CHEWUCH RIVER MILE 17-20  
FISH HABITAT ENHANCEMENT PROJECT**



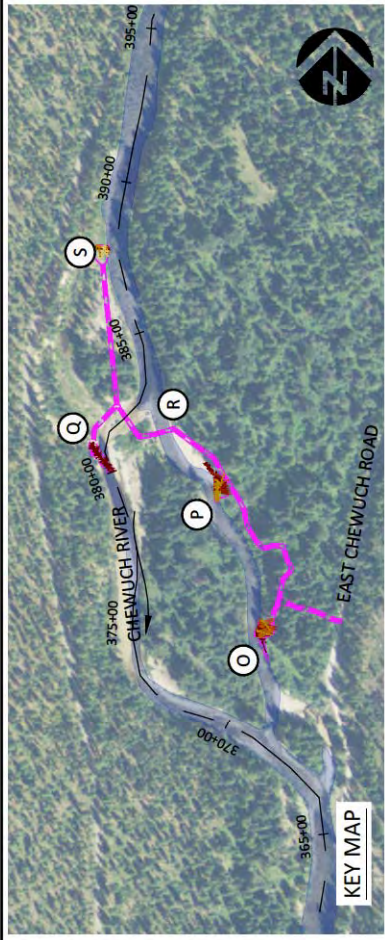
501 Portway Avenue, Suite 101  
Redmond, OR 97751  
Phone: 541.386.3003  
www.interfluvio.com

**SITE Q**

**SHEET**  
9 of 12



- LEGEND**
- TYPICAL LOW WATER
  - ORDINARY HIGH WATER
  - LIMITS OF DISTURBANCE
  - LARGE WOODY MATERIAL



REFER TO ACCESS SEQUENCE, SHEET 9.

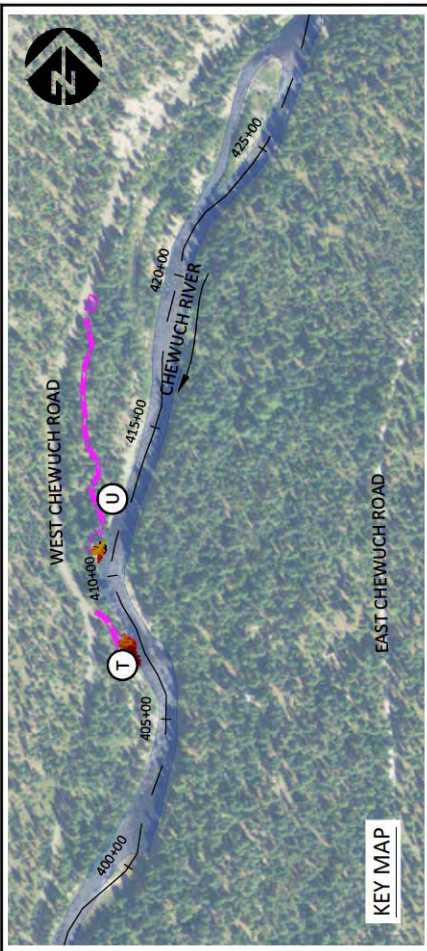
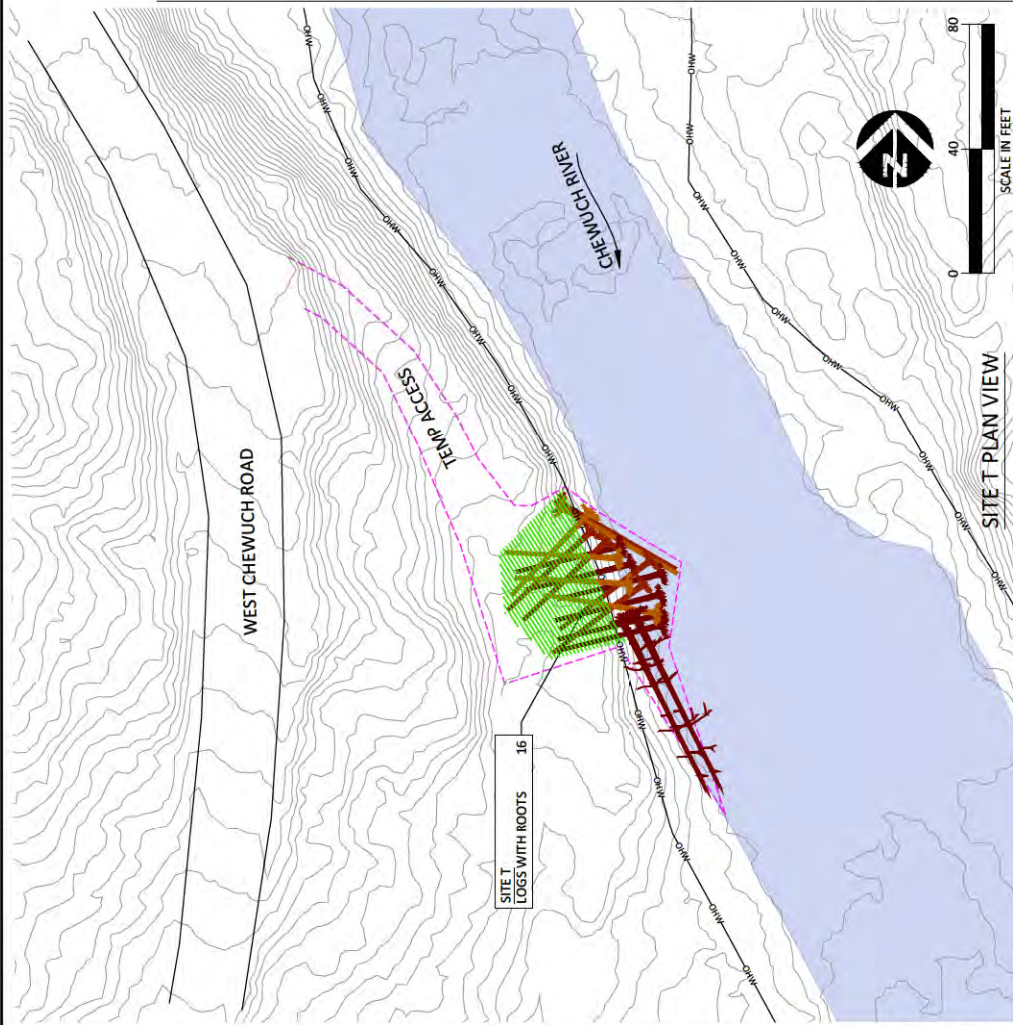
**KEY MAP**

NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN	MM DESIGNED	MM CHECKED
MM APPROVED	MM DATE	MM PROJECT
	12/31/18	

CONFEDERATED TRIBES AND BANDS OF THE YAKAMA NATION  
CHEWUCH RIVER MILE 17-20  
FISH HABITAT ENHANCEMENT PROJECT

501 Portway Avenue, Suite 101  
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- LEGEND**
- TYPICAL LOW WATER
  - ORDINARY HIGH WATER
  - LIMITS OF DISTURBANCE
  - LARGE WOODY MATERIAL
  - LWD BURIAL

NO.		DATE	REVISION DESCRIPTION

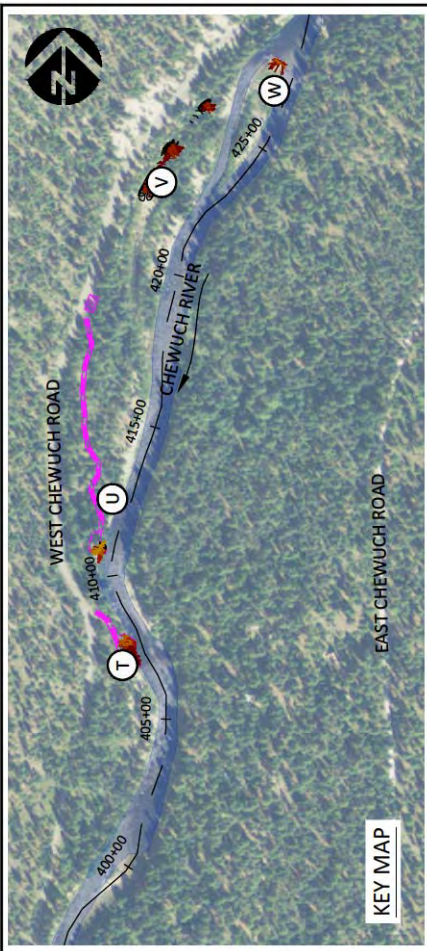
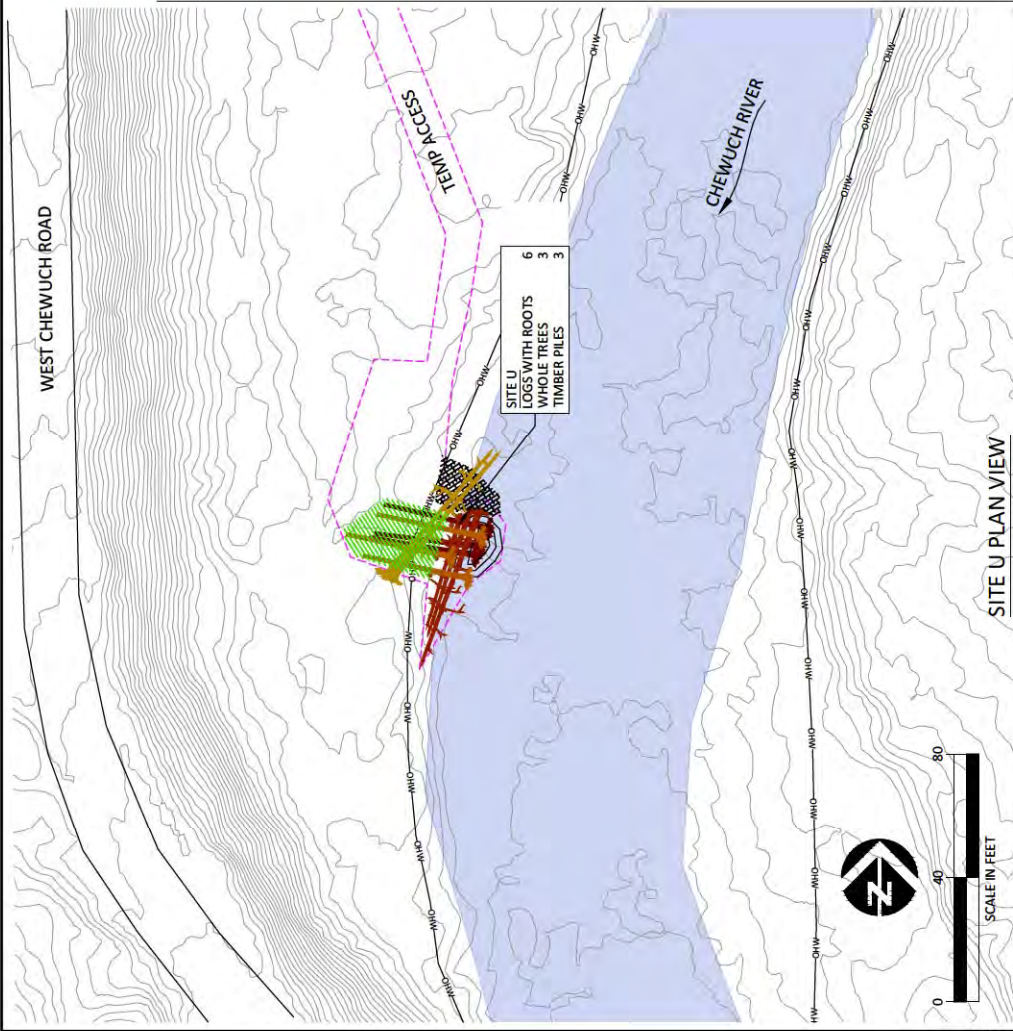
  

MM DRAWN	MM DESIGNED	MM CHECKED
MM APPROVED	12/21/18	PROJECT
	DATE	

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SHEET	11 of 12





**LEGEND**

- TYPICAL LOW WATER
- ORDINARY HIGH WATER
- LIMITS OF DISTURBANCE
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501 Portway Avenue, Suite 101  
 Hood River, Oregon 97113  
 541.386.3003  
 www.interfive.com